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IN THIS ISSUE

Gas and Electricity	1097
Electricity in Algeria. By Diana Anley	1099
Domestic Appliance Design	1105
Engineering Works Lighting	1107
Prospects in New Zealand	1109
Views on the News	1110
Circuit-Breaker Closure	1111
E.I.B.A. Ball	1114
Personal and Social	1116
Industry and the House. By A. M. F. Palmer, A.M.I.E.E., M.P.	1119
Whose Property? By C. F. Mayson, A.M.I.E.E.	1121
New Books	1124
X-Raying Gas Turbine Rotors	1125
Grid-Line Stringing	1127
Correspondence	1129
Commerce and Industry	1133
Electricity Supply	1138
Financial Section	1140
Recent Introductions	1144
Next Week's Events	1146
New Patents	1147
Contract Information	1149
Classified Advertisements	139
Index to Advertisers	154

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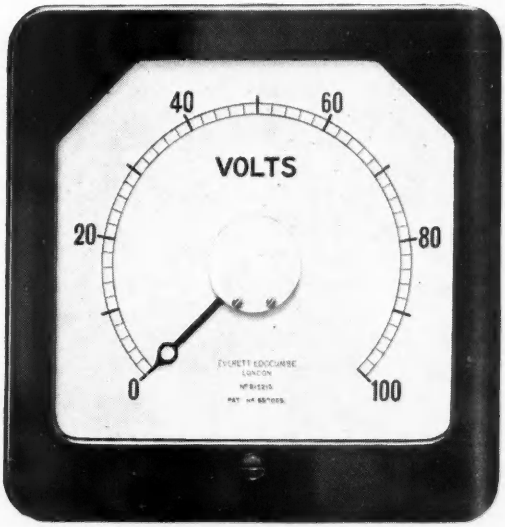

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ELECTRICAL REVIEW 21st NOVEMBER, 1952

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Gas and Electricity

WHEN the annual report of the Gas Council is published it is inevitable that comparisons should be made with the report of the British Electricity Authority which customarily appears earlier. First, of course, progress, as measured by output, is compared. In 1951–52 the twelve Gas Boards sold 2,452 million therms (excluding gas used for their own purposes), an advance of 2·1 per cent on the previous year's total. Sales of electricity in 1951–52 increased by 8·2 per cent. Of particular interest is the fact that domestic sales of gas actually fell by about 0·6 per cent while electricity sold to domestic consumers rose by 7·1 per cent. It is observed that nearly two-thirds of domestic gas sales were through prepayment meters; the tendency of the Electricity Boards appears to be against extending the prepayment meter system. A reflection upon the efficiency of older types of gas cooker is made in the statement that the Gas Boards have concentrated on the replacement of obsolete cookers by modern ones " which provide the same service with three-fifths of the consumption of gas." Col. H. C. Smith, chairman of the Council, said at a Press conference that 370,000 had been replaced during the year. There are apparently two million obsolete cookers still in use. The Council reports that on the whole sales of domestic appliances were well maintained but expansion was seriously impeded by the restrictions on publicity and hire purchase. The B.E.A. also reported that sales by Area Boards of electrical appliances were on a " reduced scale."

On the industrial side, gas sales increased by 7·5 per cent and electricity by 9·9 per cent. The advance in commercial sales was identical for both services—6·5 per cent. Naturally the provision of gas for public lighting continued to decline (by 3·2 per cent) while electricity went ahead by 9·6 per cent.

The gas industry succeeded in producing 72·77 therms from a ton of coal against 71·62 therms in 1950–51 and thus saved

400,000 tons of coal. By reducing coal consumption by 0·03 lb/kWh sent out, on an output of 55,273 million kWh, the B.E.A. secured an economy of about 740,000 tons.

Progress in the replacement and extension of gas-making plant and storage capacity has been retarded by the shortage of steel and distribution has been handicapped by limited supplies of cast iron pipes. Steel shortage also has been one of the troubles of the B.E.A.

Both industries are striving to avoid higher charges for their products but, in the face of continually rising costs, they are both forced to foreshadow higher prices in their reports.

QUESTIONS IN THE HOUSE

The report of the House of Commons Select Committee on Nationalized Industries (summarized in this issue) confirms views which we have already expressed on the subject of questions in the House on the day-to-day operations of nationalized industries. Lord Citrine summed up the position very well when, in his evidence to the Committee, he mentioned the danger of a " Civil Service " mentality growing up in these industries if the officials felt that their actions were likely to be criticized in Parliament. Already, as Lord Citrine admitted, that danger is great enough. If Members of Parliament are urged by constituents to take up specific points it should be sufficient for them to write to the Board concerned instead of making national issues of individual cases.

ELECTRICITY PRODUCTION

Statistics published by the World Power Conference, a new edition of which is reviewed in this issue, give the total output of industrial as well as public supply generating stations in most countries other than Great Britain, where returns are made for mining and traction plants only. This prevents the drawing of an accurate comparison. On the other hand British coal surveys are believed to be the most complete anywhere and show " proved reserves " to be equivalent to more than 500 years' consumption at present rates. This gross estimate cannot differentiate between rank and quality or indicate the quantity of reserves of high-grade and special coals needed for many industrial purposes, though not for the production of electricity.

SYDNEY SWITCHGEAR DECISION

It is natural for a Government which has embarked upon a policy of industrialization to foster home industries. Such aid usually takes the form of protective tariffs, but nowadays import licensing or quota systems are freely employed. While these methods encourage the protected parties, they are resented by purchasers who have to pay more for their needs. A recent case is that of Sydney County Council which has been refused an import licence for 150 sets of substation switchgear. The Council had already made a concession to home industry by ordering 75 sets locally although the prices appear to have been about 50 per cent higher than those of a leading English maker. The Council naturally dislikes having to pay so much more.

APPLIANCES FOR THE HOME

During its twenty-eight years' existence the Electrical Association for Women can claim to have had a hand in many improvements in domestic appliance design. Its latest investigation into users' requirements, contains many practical suggestions in which manufacturers are already showing a lively and sympathetic interest. It is to be hoped that the housewife's obvious resentment against purchase tax and restricted hire and hire-purchase facilities, for depriving her of labour-saving appliances to which she feels she is entitled, will receive equally sympathetic attention.

Electricity in Algeria

Water Power and Irrigation

By DIANA ANLEY

Water power station at Souk-el-Djemaa, showing pipe line

ENGINEERS in Algeria, when planning to provide the country with electricity, were faced with problems for which there was no precedent. The tackling of these obstacles has required both courage and faith.

It was decided during the last war to improve hydro-electric resources. Despite considerable difficulties, a programme of construction was put in hand in 1940. Its object was to double pre-war production and exploit existing conditions to the best advantage. The worst problem was to find materials, which were practically non-existent. The utmost ingenuity had to be displayed to adapt and improvise with available resources. Algeria at that period was completely isolated from her parent country France, from which she imports most of her goods.

Algeria has no coal resources other than a small mine in the almost uninhabited south. It yields a very poor quality coal, which is difficult and costly to transport, there being no railway in that district. The only alternative is water power.

It seemed incredible that a country where the provision of an adequate water supply is the largest single problem of the Colonial Government should be able to think in terms of hydro-electric power. So I decided to take my annual holiday and go and see for myself. I was received with overwhelming kindness and hospitality by M. M. Weckel, the director-general of Electricité et Gaz d'Algérie, and his staff. When I stated my wishes, a programme of visits was drawn up to enable me to gain a comprehensive picture of the industry.

It was explained that the water problem was a very grave one. It was difficult to foretell the means of supply. A very wet year, when all the large rivers would be in flood, might be followed by several years of extreme dryness, with little or no rainfall, when the rivers would be completely dry. The prime need was to create a reserve to offset this variation of climate. To this end, large dams had been built for water storage. They, however, were used for irrigation purposes.

Irrigation must, and does, come first so independent sources of supply had to be found for generating electricity. The searches led to the Petite Kabylie. This is a mountain massif which borders the Mediterranean coast from Bougie to Djidjelli. Traces of snow were on it even at the end of May. There are three separate schemes for storing the waters of the large rivers in this region and the first of them is in course of construction. This is the Iril Emda Dam.

I spent three days visiting this scheme, eating and sleeping in a small village that

had been specially built for the engineers and workmen engaged on an underground power station nearby. It houses about 1,200 people. Comfortable cottages, with a school, church, post office, hall for indoor functions and a sports stadium have been built by the side of the river. There the workmen live with their families. Higher up, on the side of the hill, are small but beautiful villas for the chief construction engineer and his staff. There are offices and a small hotel for visiting officials. Each room, which is large and airy, has running hot and cold water and a shower.

The road to the Iril Emda Dam passes through some wild rocky gorges to the village of Kerrata where another town had been built on the outskirts. It was necessary to do all journeys in a jeep, as it is the only kind of vehicle that can tackle the rough mountain roads. The surrounding country is very beautiful in the spring.

A number of tributaries have their origin in the watershed of the Babors and they unite upstream just above Kerrata and form the main river. The dam is being constructed to collect and regulate the waters of this river. These are in heavy flood for about four months of winter and spring, but during the summer, from June to September, the floods subside and the river becomes a small stream.

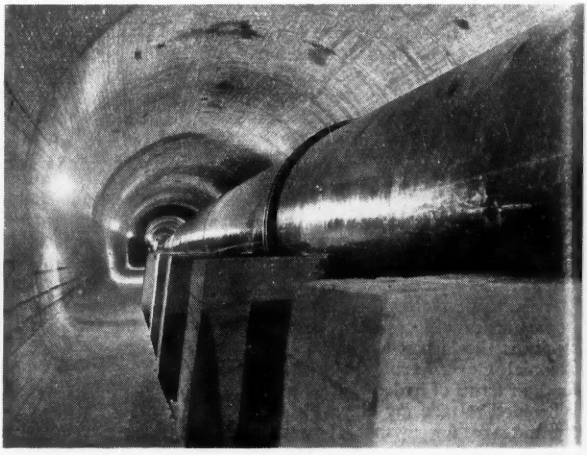
Here the engineers were faced with another great problem, the most suitable kind of dam to withstand the floods. After an extensive study of the formation of the ground, it was found possible to use a mass of fallen rocky debris from the mountain side, in the shape of small stones, situated close to the site and easy to transport.

When the dam is finished and filled with water a large area of the surrounding country will be submerged, including the main arterial road running through it. It has been necessary for the electricity concern to construct a new road, including the building of three large bridges.

The water, after leaving the dam through the station placed at its foot, will flow to a smaller dam and enter a tunnel that leads to the underground power station of Ahzerouftis. There a further problem was encountered. The bed of the river formed a platform which was the only available site in this country of mountainous slopes. It was necessary to divert the course of the river through a tunnel bored in the rock. The bed then had to be well drained and the platform built up to form a solid foundation on which were placed the workshops, stores and a large substation from which five 150 kV transmission lines radiate.

In the main power station of the scheme, the control room and air conditioning plant are the only portions which are built above ground. Contrary to most building arrangements, the top storey and roof were completed first, before excavating and constructing the main body of the building. This station is 220ft long by 66ft wide and it is 72ft high inside, in the form of a nave, in which it would be possible to place that of Notre Dame de Paris. The plant operates under a head of 1,230ft, which feeds water to two 46,000 h.p. vertical shaft four-jet Pelton turbines installed by "Neyrpic." The hall, which houses the 40,000 kVA

Welded pressure pipe inside tunnel



Alsthom generating sets, is decorated in shaded blue tiles with a wonderful blue and white mosaic floor. The whole building is air-conditioned throughout and contains up-to-date equipment. The layout is perfect from an electrical engineer's point of view.

On this journey I visited several hydro-electric stations, situated in the Petite and Grande Kabylie, then returned to Algiers for two days rest before setting out again westwards towards Oran where the country is quite different. In that area are most of the irrigation schemes. By the courtesy of the Colonial Government's Hydraulic Service (directeur: M. Georges Drouhin), I visited several of their large dams. Wonderful work is being done by this Service, and other concerns, to fertilize and cultivate the country.

For instance, the alliance of power and irrigation resulted from the decision of Electricité et Gaz d'Algérie, for much the same reasons as those mentioned earlier and at about the same time, to augment its sources of hydro-electricity. Plans were accordingly made for the construction of power stations at the foot of dams used for irrigation to use the head created by those reservoirs. One very important point, however, had to be borne in mind. They would be subjected to the needs of irrigation, so could only be used when water was drawn off for this purpose. As the irrigating period does not always correspond with that of the maximum demand for electricity, the station would only serve to raise the annual output, and could not be relied upon as a regular source of electricity.

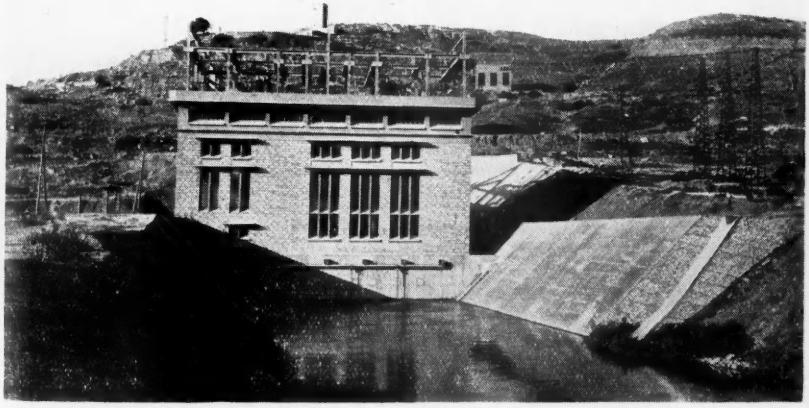
By constructing a smaller compensating dam downstream from the tail race, at some considerable distance, it was found possible to extend the normal period and raise the number of daily running hours.

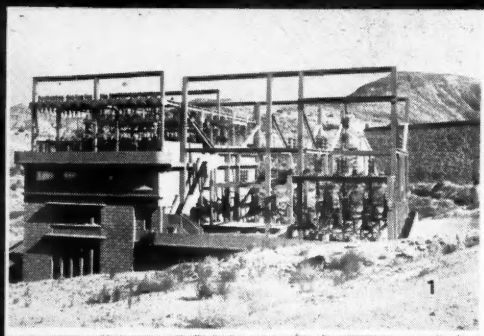
One of the most important of these irrigation dams is that of Bou Hanifia. It is in Western Algeria, in the Oran district, about 22 miles south-west of Mascara, on the Oued-el-Hammam. It is a rock-filled dam of a capacity of 71,400,000 cubic metres and is used to water the once arid regions around Perrégaux. Thanks to an assured water supply, about 22,000 hectares of sterile land have been turned into fertile and prosperous country. There are acres of orange groves and vineyards and land-owners are even experimenting with the cultivation of rice.

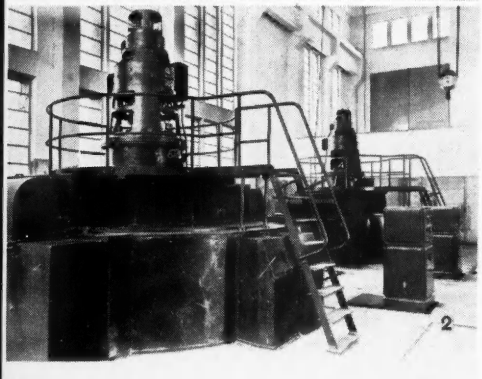
The power station of Bou Hanifia utilizes the fall (which averages about 37 metres) created by the water level behind the dam. Annual production is about 9 million kWh with an installed power of 7,000 kVA.

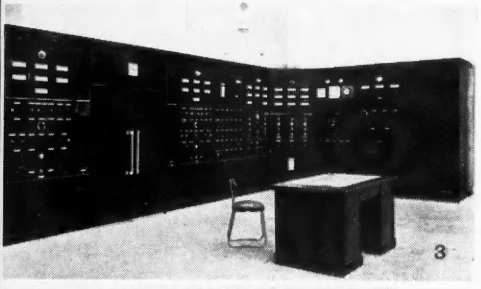
The penstock consists of 35 sections of steel piping, made in three different diameters by the American Locomotive Co. of New York. Transport was made

Hydro-electric power station at Bou Hanifia









easy by this difference in diameter, as the pipe lengths were packed one inside the other, thus reducing space by one-third. They were assembled and electrically welded on site. A butterfly valve is placed at the head, which will close automatically in case of damage to the pipe line. The pipe has been carried through an old subterranean tunnel, which was constructed and used during the building of the dam to divert the waters of the river.

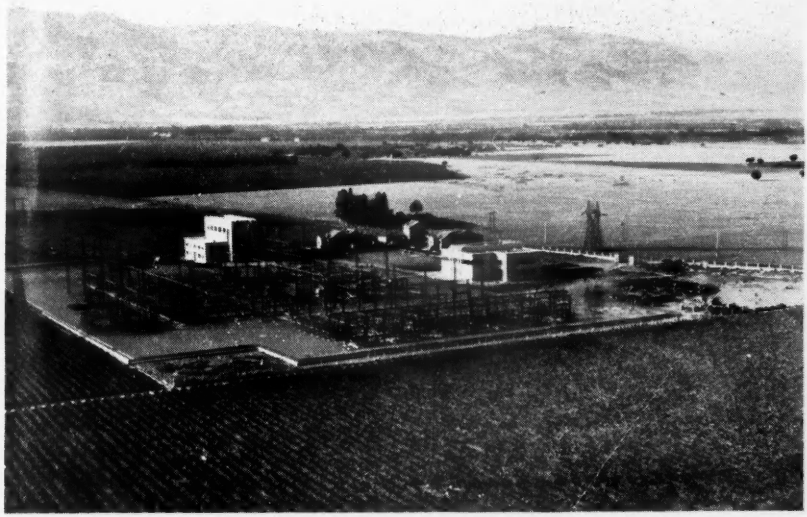
The plant contains two sets of vertical shaft Francis turbines running at a speed of 500 r.p.m. They are directly coupled to 3,800 kVA 5,750 V three-phase alternators and the output is stepped up to 30 kV and 60 kV respectively by transformers. The 60 kV line is carried to a transformer station at St. Lucien connected to a 150 kV grid. It is hoped at some future date to link up the system with Morocco and Tunisia.

The station itself is semi-automatic and is run by a staff consisting of three European engineers and three native mechanics, who are all housed on the spot.

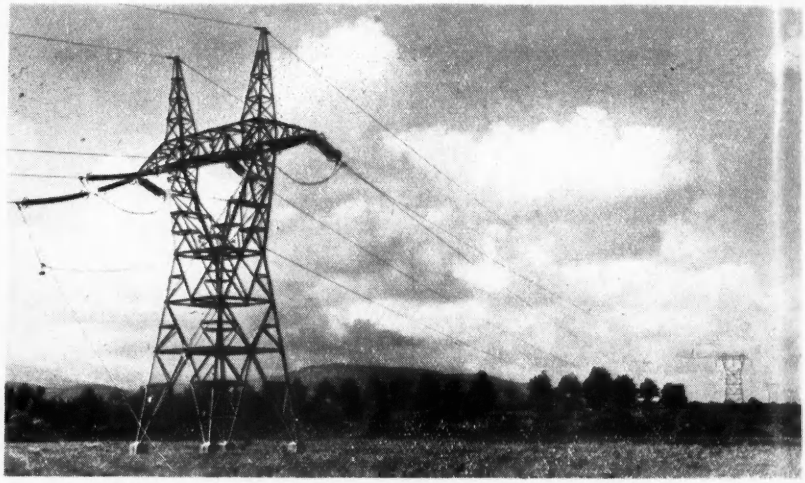
When planning the Bou Hanifia power station it was necessary to find a site as low as possible in order to secure the maximum head. This was difficult, owing to the unfavourable condition of the soil. It was possible to construct the foundations of the building on a small platform, but there was insufficient space to allow for the installation of a switchyard. The only solution was to erect the switchgear on top of the station roof. The result is not unsightly, as can be seen in the picture, and in no way detracts from the ensemble when seen against its natural background.

My last visit was to one of the three steam stations in Algeria, that at Oran. It is not yet completed, although already generating power. It is a beautiful white building, equipped with up-to-date plant, on a site near the harbour, which makes it easy to ship and unload coal. All metal parts and equipment have been placed in buildings to protect them from the action of the sea air. One of its main features is its laboratories. They are divided into three sections: one for the study and

(1) H.v. switchgear on power house roof. (2) The two 3,800 kVA generators. (3) Main station control board. (4) Line sectionalizing post at Bonitra



Above: **The 150 kV switching station at l'Arba**
Below: **Ravin Blanc steam generating station, Oran**



Typical 150 kV power transmission line

analysis of coal, another for water and the third for oil.

So Algeria presses on with plans to provide more electricity. Every engineer and official to whom I spoke was full of enthusiasm and confidence in the future. Nearly all of them had come over from France. The educated Arabs do not take up engineering as a profession, but prefer to study law and medicine. One of the greatest problems that had to be overcome was the shortage of skilled labour. This has necessitated the adoption of automatic control for many of the power stations.

The chief engineer, M. Frixon, has procured a small helicopter, which he uses to inspect damage to overhead lines, etc., enabling him to cover considerable distances and visit difficult parts of the country.

It is hoped to establish light industries to make Algeria more self-supporting and less dependent on imports, the advisability of which was brought home very forcibly during the last war.

St. Lawrence Power Project Approved

CANADA and the United States received official sanction on 29th October to go ahead with plans for a 2,300,000 h.p. hydro-electric development on the international section of the St. Lawrence River. The giant project is part of Canada's proposal to construct the long-awaited St. Lawrence seaway, which also moves a step towards fruition with the power scheme. The authority came from the International Joint Commission, which announced its approval of a joint Canada-U.S. application for permission for designated agencies to build power installations at a cost of $450 million on the St. Lawrence near Cornwall. The Commission, a Canada-U.S. body which regulates boundary waters, noted in its announcement that only the naming of an agency by the U.S. Government now prevents a start on construction of the power works. Canada has named the Ontario Hydro-Electric Power Commission as its agency. A Washington dispatch says the New York State Power Authority has already applied for a licence to construct the works on the U.S. side of the river. Canada had already undertaken to build the $300 million seaway, to open the Great Lakes system to ocean-going ships, if the Commission approved the power scheme. In Ottawa, the Minister of Transport (Mr. L. Chevrier) has expressed the hope that construction of the seaway will start next year.

Domestic Appliance Design

E.A.W. Inquiry into the User's Point of View

OPINIONS and suggestions from the personal experience of 1,300 actual users of domestic appliances provide the material for "Towards Perfection," a report of the latest survey conducted by the Electrical Association for Women into the electrical equipment of the homes of this country. While including many practical suggestions for improving appliances, the report reveals a great measure of satisfaction with the design and performance of existing apparatus and affords evidence of the long, largely repair-free, life of well-chosen appliances.

The question of cost figures largely throughout the report and prominence has therefore been given to proposals not likely to raise prices unduly. It is apparent that the housewife would not be prepared to meet the extra cost entailed in incorporating many of the minor improvements suggested. Manufacturers must therefore look to improved production methods, technical developments and the use of new materials to enable them to adopt these improvements without increasing the cost of the appliances. There is evidence of much criticism of purchase tax and a desire for reduced electricity and wiring charges and for hire purchase facilities for goods costing over £5. The inability to hire a cooker is stated to be a real hardship to young married people.

Quality of Apparatus

Special concern is revealed in the matter of safety and much interest is shown in protecting the housewife against the purchase of shoddy appliances and accessories, the issue of certificates of merit being favoured by virtually everyone. While the standardization of components is welcomed for easy replacement, stress is laid on diversity of need, with particular reference to the cooker. Attention is also drawn to the need for appliances meeting the requirements of people living alone and of the two-person families. The compulsory fitting of suppressors to appliances liable to cause interference with radio and television reception is universally advocated and there are requests for fittings to bring old appliances up-to-date and for higher loadings of boiling plates, ovens, kettles and washboilers.

Suggested Cooker Improvements

Many of the suggestions have already been incorporated in some appliances and manufacturers will therefore see in the requests an endorsement of the value of these improvements. This is particularly the case in respect of the cooker, for which there appears to be still scope for considerable variation in design. A proportion of sixteen to eleven users favoured legs in preference to a solid base with toe recess, and for every five women wanting a cupboard or drawer beneath the oven one would prefer the space to be used for a heater to warm the kitchen. Adjustable or alternative legs to give various working heights are suggested. Of those who wanted more than four-heat variation for boiling plate control nearly two to one were in favour of having it on all plates rather than one only. A glass panel in the oven door or a complete glass door is widely asked for and there is also a suggestion for an oven the size of which can be adjusted by one or two partition sheets. A recess for holding knives and spoons in use while cooking, a tray for seasonings, a towel rail and higher splash plates are other features desired.

Whether a fire itself carries purchase tax or not it is felt that at least the guard should not. The extended use not only of the thermostat but also the time switch holds great possibilities in electric heating. Coloured tubular heaters to match decorations are welcomed.

The need for greater attention to the design of iron handles, with the possibility of offering a choice, is emphasized, and the question of the most convenient shape of iron is also raised. A revolutionary suggestion is that a flat rectangular surface with incorporated heating elements to go on a table under the article to be ironed,

with a roller to be used above it, would prove efficient. A hand iron with a roller incorporated is another idea. A switch incorporated in the handle is asked for by some women.

To save boiling unnecessarily large quantities of water through having to cover the element, it is suggested that kettles should be fitted with flatter elements, perhaps grid-like and closer to the bottom. For hard water districts divided, hinged elements and a larger spout are suggested. Further improvements asked for repeatedly are higher loadings and better protection for the hand against steam. For owners of old kettles, protective devices might be made available for fitting to the lids.

The door is considered the least satisfactory part of the refrigerator, other comments being in connection with quietness of operation and the need for castors or wheels for facility of cleaning. The use of lighter materials for vacuum cleaners without sacrificing power is suggested, carrying being also made easier by the provision of a handle near the motor of the bag type models.

An exploration of how far materials other than metals can be employed might well be extended, especially with regard to plastics and glass. Could not the idea of glass lids, already available for some pans, be extended to kettles, washboilers and washing machines?

Indication that the boiling point is near is wanted on washboilers, together with better draining arrangements, more robust switches, castors and markings in gallons on the inside. Twice as many women like square models as round. A review of the laundry habits and preferences unexpectedly show little difference as regards north and south of the country, though widely differing time is spent on laundry work by families of different size, for causes frequently related to locality.

There is an overwhelming demand for a multi-purpose fractional h.p. motor, possibly mounted on a wheeled stand and easily transportable, for operating tools for scrubbing floors, dusting, vacuum cleaning of floors and carpets and cleaning carpets with some kind of soap; polishing floors, furniture and metalware; window cleaning; cleaning shoes; operating a wringer, vegetable peeler, pan scourer and bread cutter, plus all the kinds of work normally performed by mixer-beaters.

Other appliances for which requests were frequently made were devices for clearing ashes from domestic grates and for sweeping chimneys, ignition devices for lighting solid fuel fires; knitting, darning and wool winding appliances; a refuse disposal unit; a dish washing and drying machine for small families; an electrically driven pram for hilly districts; noiseless switches; a device for slot meters giving an audible warning some minutes before a coin has to be inserted; a tin opener; built-in keyhole lighting; an inexpensive mixer and egg beater; and electrically heated curling tongs.

"Towards Perfection" is available from the E.A.W., 35, Grosvenor Place, London, S.W.1, price 2s 6d.

Purchase Tax on Electrical Appliances

IN its November bulletin the North Western Electricity Consultative Council says that in the past it has considered purchase tax on electrical appliances mainly from the point of view of safety. It believes, for instance, that the indiscriminate application of 100 per cent tax to all electric radiators is unwise because it increases appreciably the difference between the prices of radiators without safety devices and the prices of radiators with them. Now, however, the Council is equally concerned about high tax levels on such appliances as water heaters and washing machines. Water heaters are largely used in the summer, when peak demand can be met fully, and washing machines have a small loading that is mainly off-peak. The Council has been informed that large stocks of these appliances have accumulated in recent months, so that an increase in demand could be met without diversion of effort and materials from the defence programme. These views have been brought to the notice of the Chancellor of the Exchequer, and the Council hopes that other organizations will bring to bear what pressure of public opinion they can with the object of having purchase tax on these appliances reduced.

Coronation Lighting

PROPOSALS have been formulated by the London County Council for illuminating the Thames Embankment (north and south) and County Hall, the Royal Festival Hall and the London Fire Brigade Headquarters, as well as Waterloo and Westminster Bridges, during the Coronation period. A sum of £14,500 will be allocated for the purpose and some of the installations will be of a permanent nature.

Engineering Works Lighting

Large Cold Cathode Installation

Turbo-alternator erecting shop of C. A. Parsons & Co., Ltd. Six lines of G.E.C. triple-tube cold cathode industrial fittings are installed. The machine on the right of the picture is a 100 MW turbo-alternator

A FLUORESCENT lighting installation, which the General Electric Co., Ltd., claims to be the most extensive in the world, is now nearing completion at the Heaton heavy engineering works of C. A. Parsons & Co., Ltd., Newcastle-on-Tyne. It comprises twenty-three miles of cold cathode tubing. The scheme began in one of the foundries in 1947 and will have taken six years to complete. Part of a general scheme of expansion and modernization, the lighting was planned by the Engineering Department of C. A. Parsons Works in collaboration with the General Electric Co., Ltd., which supplied all the tubes, lighting fittings and auxiliary gear. Altogether a floor area of 454,000 sq ft of engineering workshops has been illuminated so far. The final section, a new research building covering 120,000 sq ft to be completed in 1953, will employ troughed aluminium ceilings as a combined lighting and heating medium. These have already been installed experimentally in two laboratories.

A special heavy duty fitting has been employed throughout, mostly with triple tube arrangement, but in some cases four tubes employed in the same fitting have been found both technically and economically more suitable. The fitting is completely self-contained with a 3-pin plug and socket arrangement for connection to normal lighting mains. The overall consumption of a complete 3-tube arrangement is 250 W and standard "Osram" 9ft 6in cold cathode tubes (lighting length 8ft 6in) of "intermediate" colour are used throughout. The vitreous enamel reflectors are built in two 4ft 3in lengths, easily removable for cleaning without the necessity for removing lighting tubes.

In the heavy foundry the average illumination given at floor level by fittings at a mounting height of 42ft is 10 lm/sq ft. The Pipe Division comprises three bays, 40ft 6in high from the normal floor level to eaves. Two are 450ft long and 60ft wide, and the third is 600ft long by 60ft wide. This Division handles the fabrication of high pressure and other piping for new power stations and similar installations. Here good even illumination for a total area of 92,000 sq ft is provided by lines of cold cathode tubes mounted at 35ft along the roof and at 20ft along the sides of each bay. The average level of illumination is 9 lm/sq ft.

In the condenser bay cold cathode triple-tube fittings mounted at 35ft in two lines along the roof and at 22ft along the sides of the shop give an average service illumination of 9 lm/sq ft over an area of approximately 21,000 sq ft, and shadows have been almost completely eliminated. The blade rolling and assembly shops are each 360ft long, 57ft wide and 26ft 9in high from normal floor level to eaves. The adjoining

blade assembly shop is used for assembly and machining operations on all types of blading. Cold cathode lighting in these shops gives such efficient general illumination (an average of 14 lm/sq ft) that no independent lighting is required on individual machines. In the annexe to these shops, where finished integral blades are ground and polished, the lighting fittings have been arranged at an angle inclined to the work to give maximum illumination efficiency.

Two heavy machine shop bays are 560ft long and 40ft wide and have triple-tube fittings mounted at 35ft above floor level and at 22ft at the sides. Two assembly bays 400ft by 40ft and 430ft by 80ft, used for the assembling of large turbo-alternators up to 100 MW, have similar fittings mounted at 35ft above floor level and again a row of fittings at each side at a height of 22ft. The merits of a low brightness large area light source are most striking in these bays, all surfaces in both horizontal and vertical planes receiving a share of the available illumination, thus eliminating brightness contrasts and heavy shadows. Very few individual supplementary lights are needed.

From a lighting aspect the new transformer shop, in which the largest and highest voltage transformers and reactors are constructed, is worthy of particular notice in view of the loftiness of the building. Although the five lines of cold cathode tubing are mounted beneath the roof, and the distance from floor to eaves is 54ft 6in, the average illumination level is nevertheless 12 to 15 lm/sq ft. Operations on many large components, which formerly demanded local lighting, can now be performed by the light of the cold cathode tubes in the roof.

The new lighting scheme adopted for some of the research laboratories is an interesting experiment in the use of aluminium as a combined lighting and heating medium. The aluminium troughing, which is connected directly to steam pipes, is anodized to improve its light reflecting properties. Lines of cold cathode tubing are fitted in the aluminium troughs, and for acoustic reasons the aluminium is perforated. The excellent illumination of from 50 to 60 lm/sq ft given by this system is proving ideal for the close work which is involved in assembling infra-red gas analysers, spectrometers and other scientific instruments.

I.E.E. President at Liverpool

SURVEYING the range of opportunity for the electrical industry at the annual dinner of the Mersey and North Wales Centre of the Institution of Electrical Engineers held at Liverpool on 10th November, Col. B. H. Leeson, President of the Institution, stressed its enormous potential in helping export trade. Mr. W. A. Hatch presided and there was an attendance of 160.

Col. Leeson said that there was nothing technically lacking in the electricity supply industry, but what it did need were the resources of money, labour and materials to enable it to deliver the abundant electricity this country must have if it was to make effective economic recovery. The manufacturing side was one of the largest exporting industries, approximately a third of its products being shipped overseas. The amount of money being spent on research to keep the profession and the industry right up to date was in the nature of £10 million and, with improvements in education from the craftsman to the scientist, they could keep Britain in the forefront. That could be done but for one thing, namely the general conditions now prevailing. The electrical industry was shackled and handicapped and was in a straitjacket of shortage of money, men and material. There was much talk about the need for increased production, but to render that possible electricity was a first essential. We had to work out a sequence, he said. In the basic industries of coal and steel higher outputs were necessary to get the factories working full time and to get out of the vicious circle in which we were now placed, chasing our tails. That was the challenge of the times.

After a reference to atomic energy, Col. Leeson said that scientifically we were in advance of the rest of the world, but we had not the resources at the moment to bring into practical fruition as quickly as all would like the benefits of our scientific work.

The toast to the I.E.E. was proposed by Mr. J. B. Watt (managing director of Pilkington Bros.), who said that in the difficult years ahead industrialists would need the help of the electrical industry more than ever before. In research we had a long way to go before we would reach the standards of the United States.

Mr. J. Eccles, chairman of the Merseyside and North Wales Electricity Board, proposed the toast of the guests, and the Lord Mayor of Liverpool (Ald. A. Morrow, J.P.) replied.

Prospects in New Zealand

Minister Forecasts Unabated Demand for Ten Years

REVIEWING the power situation in New Zealand, the Minister in charge of the State Hydro-Electric Department (Mr. W. S. Goosman) says it is evident that it will take an all-out effort to keep pace with the generally accepted rate of growth of consumption of 10 per cent per annum. Though there must ultimately be some falling off, he does not visualize this happening within the next decade. Besides the rise in general consumption, provision must be made for special loads such as pulp and paper, fertilizer production and railway electrification.

All these special loads are concerned with the North Island and, in the absence of a link with the South Island, must be met from the resources there. To do so will necessitate the completion of the Waikato, Kaituna and Rangitaiki hydro-electric schemes within the ten-year period and the provision of not less than 100,000 kW of steam plant. The problem would be relieved by a successful outcome of the investigations into the availability of sufficient geothermal steam at Wairakei to justify the installation of 20,000 kW of plant. On this the Minister declares: "Personally I have the utmost confidence that geothermal steam will take its place as one of the power resources of the North Island."

This would also be likely to assist in keeping down operating costs. The general manager of the Department (Mr. A. E. Davenport, B.E., M.I.E.E.) in his report draws attention to the high cost of operating fuel stations, citing the figures given in the accompanying table. These, of course, must be considered in conjunction with the capital costs of the respective types of plant. In addition to the generating and distribution costs of £2,570,553 the Department had to meet interest charges of £1,387,787 and provide £380,523 for depreciation together with a statutory loan redemption charge of £372,604. When these are set against the total revenue of £4,544,306, the result is a net deficit of £167,161. For the current year a much larger deficiency is expected and the general manager thinks it a pity that the supply authorities' tariffs were not freed from control by the price tribunal in time to allow them to absorb some of the deficit.

COMPARATIVE GENERATING COSTS

	Million kWh Generated			Generating Costs		
	1950	1951	1952	1950	1951	1952
				£	£	£
State hydro ..	2,689	2,643	3,040	278,663	285,115	326,484
State fuel ..	48	152	172	245,394	687,339	924,102
Other*	134	147	87	373,515	500,578	272,473
Total ..	2,871	2,942	3,362	897,572	1,473,032	1,523,059
	Distribution costs ..			928,105	894,559	1,047,494
	Total			1,825,677	2,367,591	2,570,553

*Auxiliary and stand-by plants; purchase of power and stand-by charges.

In the South Island the operating difficulties were intensified by a storm of great severity which disrupted the supply system. Highbank power station ceased generating on 21st April, 1951, and was not brought back into operation for nearly a month. The situation might have been eased if the new Tekapo power station had been ready, but a fault developed while the generator was on test, necessitating major mechanical work. The station actually went on load on 25th June and the 25,200 kW which it represented was the only increase in installed capacity during the year. Capital expenditure on the various projects, however, amounted to £10,067,096.

An appendix on the work of the Rural Electrical Reticulation Council shows that up to 31st March last subsidies had been approved on 2,057 route miles of line which will supply some 3,641 consumers. The total capital expenditure is estimated at £1,208,749 and the annual subsidy payable amounts to £58,102. Of this work 1,220 miles of line had then been completed and 2,354 consumers connected.

VIEWS on the NEWS

By REFLECTOR

THE Great Ballroom of Grosvenor House was pretty well filled by the gathering at the E.I.B.A. Ball last Friday. Over a thousand attended and it was very difficult to find people whom one knew were there but were lost in this vast assembly. Everybody seemed to be having a good time, encouraged by the thought that the Association's funds were being substantially added to. The organizers had plainly put in a great deal of hard work but they must have been recompensed by the obvious success of the function.

* * *

Committee men's hearts must have been gladdened by the attendance of 286 members and guests (which greatly exceeded expectations) at the I.E.E. Measurements Section dinner at the Café Royal last week. The speeches, too—at a function which has always been entirely informal though not by any means silent—were delightfully entertaining. Indeed, after listening to the President, who even broke into verse, the vice-chairman wondered whether he could have mistaken the B.E.A.M.A. for the British Entertainers' and Mirthmakers' Association. And the chairman, who has spent most of his life measuring things, particularly very small capacities, had shown himself to be possessed of considerable capacity for managing the Section affairs and keeping them all in order although Dr. Hartshorn disclaimed any such attributes, since, as he said, the Section seemed to run on Steel rails.

* * *

Another human dynamo has been discovered—this time in Cardiff. The *South Wales Echo* reports that he has merely to take an electric light bulb in his hands and it "glows uncannily." It is explained that "the static electricity in his body ionizes the inert gas in the bulb rather in the fashion a neon tube works." Reading about this Cardiff man in a Copenhagen paper a resident of that city says that he, too, has been "full of electricity since some years ago I was narcotized by means of spinal narcotization." There is a music hall artist who makes electric lamps light up with no apparent apparatus or wires, but I doubt if he depends on innate electrical energy for his very effective phenomena.

* * *

The Times announces the formation of a National Association of Telephone Applicants "to assist those people who are waiting for telephones." The Association seems to have taken on a pretty big job for about 450,000 people are on the G.P.O.'s waiting list. Short of supplying and laying cables and extending exchange buildings and plant it is difficult to see how the new body can improve the situation. In one sense the word "assist" can mean "comfort." Perhaps it is this limited form of assistance that is offered.

* * *

A further proof that union is strength was provided by the large collection of starlings which descended upon a 33 kV conductor in South Wales and forced it down upon another causing a breakdown of supply. Hundreds of the birds perished. A starling weighs only an ounce or two, hardly more than severe ice loading on the length of line occupied, but the combined weight of thousands is considerable. Yet the Overhead Line Regulations can hardly be amended to take care of this infrequent sort of occurrence.

* * *

Readers will think that my advocacy of meter cards is an obsession but I think I should mention that the Huddersfield local committee of the Yorkshire Electricity Consultative Council expresses "grave concern" at the Yorkshire Board's decision to issue cards only to those who ask for them. This does not take account of the inertia of consumers or their diffidence in putting forward such a request. I still think that the issue of meter cards as a normal procedure is desirable and that the saving by withholding them is insignificant.

Circuit-Breaker Closure

New Approach to the Problem

THE problems involved in the operation of circuit-breakers, particularly under emergency conditions, are by no means simple, and although many devices have been developed with a view to overcoming the various difficulties which present themselves, they all seem to have disadvantages.

For example, a motor wound spring-operated circuit-breaker relies on an independent electrical supply and can be closed once only if that supply is not available. A solenoid operated circuit-breaker, however, requires a large storage battery to achieve a succession of closing operations. Alternatively, it may employ a rectifier energized from an independent electrical supply, but the breaker cannot be closed unless that supply is assured. In the case of a pneumatically operated breaker working at low air pressure a multi-stage compressor is required and this makes the scheme uneconomic for stations having only two or three breakers.

All of the foregoing disadvantages are overcome in the pneumo-hydraulic closing mechanism recently developed by the Brush Electrical Engineering Co., Ltd., and from what we saw when the device was demonstrated in conjunction with a 1,000 A 33/38·5 kV 750 MVA outdoor type oil circuit-breaker at the company's Loughborough works last week it undoubtedly offers an economic means for operating circuit-breakers in one-, two- or three-switch stations.

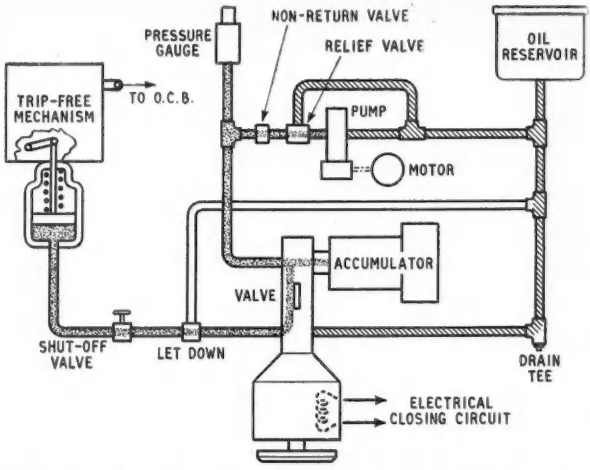
Brush pneumo-hydraulic closing mechanism applied to a 1,000 A 33/38·5 kV 750 MVA outdoor type oil circuit-breaker

This new closing mechanism is essentially a stored energy device. The basic element is a pneumatic accumulator of the type which has been used for many years for the impulse starting of heavy diesel engines. Oil is stored at high pressure and is released by an electrically operated valve or by hand into an operating cylinder to close the circuit-breaker. The valve may be energized from a 10 Ah tripping battery and the stored energy is sufficient to close a large circuit-breaker four times without recompression and irrespective of the availability of local a.c. supplies or large storage batteries. The advantages which this device offers for supervisory control or reclosing duties are obvious.

The accumulator itself consists of a small steel container with a "Neoprene" diaphragm. The container is filled with air compressed to about 2,000 lb/sq in and it is positively sealed. As there can be no leakage and air is not consumed, the accumulator never requires recharging with air. When air only is in the accumulator the diaphragm rests against the inside wall, but when oil is pumped into the lower part of the body the air at the back of the diaphragm is compressed to about 4,000 lb/sq in. The diaphragm completely isolates the air from the oil; the pressure on both sides is equal in the charged state so the diaphragm is not subjected to any strain.

The two-way operating valve is a simple

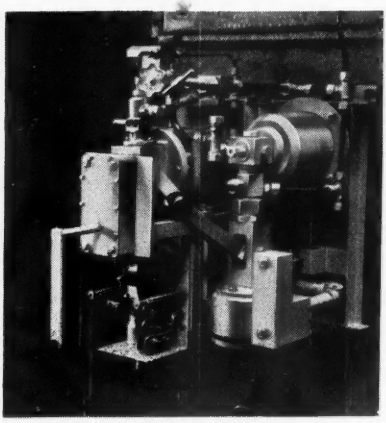
device with metal-to-metal seatings. In the de-energized position oil is contained under pressure in the accumulator, in the pipe line to the pump and as far as the main valve seating. When the valve solenoid is energized the initial movement of the plunger causes communication between the circuit-breaker operating cylinder and an oil reservoir to be sealed. Subsequent movement of the plunger opens a pilot valve and permits a restricted flow of oil to the operating cylinder to take up any slack in the mechanism. Continued movement lifts the whole of the main valve assembly and allows an unrestricted flow of oil to the operating cylinder.



Schematic diagram of the pneumo-hydraulic circuit-breaker closing mechanism showing the function of the various component parts of the system

Upon de-energizing the solenoid the action is reversed, the main valve first seating under spring pressure and the pilot ball valve then seating also under spring pressure. Final movement of the solenoid plunger causes oil in the operating cylinder to return to the reservoir, being impelled by a spring behind the piston. A sealing switch operated by the solenoid push rod ensures that the valve solenoid once energized remains so until the circuit-breaker has completed its closing stroke.

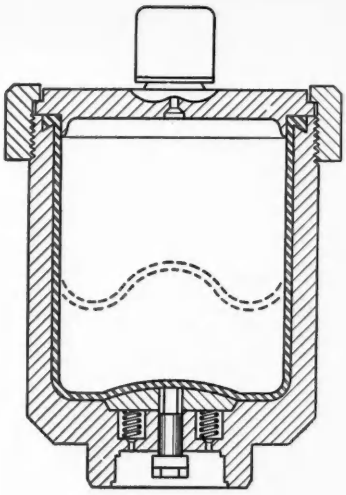
Close-up of the mechanism with hand-operating lever and hand-charging device fitted



A standard fuel injection unit, as used on diesel engines, pumps oil from the reservoir to the accumulator. This pump is motor driven, a pressure switch starting the motor automatically upon a fall in pressure in the accumulator and stopping the motor when pressure is restored.

The pressure switch normally disconnects the driving motor at a predetermined pressure in the accumulator, but as a back-up safety feature a relief valve is connected on the high pressure side of the pump and under excess pressure this opens to return the oil to the reservoir. Another pressure switch operates a cut-out switch which interrupts the control valve solenoid circuit if the accumulated pressure is too low for a satisfactory closing operation. Both pressure switches are operated from a plunger type pressure gauge.

The pump is driven by a 0·25 h.p. capacitor-start single-phase induction motor. The leakage from the accumulator is negligible so that once the accumulator is



Sectional view of the accumulator showing the normal position of the diaphragm and (dotted) charged with oil sufficient for four closing operations

charged the pump will not operate unless the circuit-breaker is operated. The motor will run for about 30 sec to recharge the accumulator for one operation of the breaker.

The control valve can be hand operated for emergency closing at normal speed. With sufficient fluid stored for four closing operations it is unlikely that hand charging will ever be necessary. Nevertheless, a small hand attachment for this purpose can be fitted to the pump shaft.

Satisfactory operation of this pneumo-hydraulic closing mechanism under short-circuit conditions has been demonstrated during certification tests to prove the making and breaking capacity of the company's oil circuit-breakers. The device can be applied to any normal trip-free circuit-breaker operating mechanism and for supervisory or remote control a 30 V tripping battery is sufficient to close the breaker, the consumption being about 120 watt-seconds. Additional advantages of the device are that the constant pressure on the piston gives most desirable circuit-breaker closing characteristics and that the light mass of moving parts gives rise only to very small impact forces on the breaker mechanism.

Old Centralians

THE 42nd annual dinner of the Old Centralians, i.e., former students of the City & Guilds Engineering College of the Imperial College of Science, was held on 17th November at the Grocers' Hall, London, E.C.2. The toast of "The Old Centralians and City and Guilds College" was by Sir John Maud (Permanent Secretary, Ministry of Fuel and Power), who, speaking from seven years of experience with the Ministry of Education, referred to the opportunities before the College in connection with the Government's plans for expanding technological education.

Response was made by the president, Mr. A. G. Ellis, who after recalling outstanding points and personalities in the 73 years' history of the College, spoke of the pleasure given by the decision of the Duke of Edinburgh to accept the presidency of the Institute of Technology. The object of technology in a university was to produce broad-gauged engineers. The membership of the Old Centralians, he said, numbered 2,500.

The Dean of the College, Professor Willis Jackson, who also replied, stated that further accommodation was needed for two to three times the number of undergraduates, which was now greater than ever at 800, plus 270 post graduates. Close liaison had been maintained with the London School of Economics (largely attended voluntarily) and lectures and discussions were held on economics in industry, art, literature and music in extended lunch intervals.

The health of "The Guests" was proposed by Sir Frederick Handley Page, who deprecated the view that the classics provided the only hall mark of higher education, since science was also a basis for common knowledge. The City & Guilds provided an example of private enterprise which had foreseen the need for technological education long before it had become generally realized. Mr. Justice Wynn Parry appropriately replied for the guests.

Glass Industries Exhibition

WHAT is believed to be the first national exhibition devoted solely to the British glass industry, and of interest to all users of glass in its industrial and domestic forms, will take place at the New Horticultural Hall, Westminster, S.W.1, from 11th to 16th May, 1953.

Coming as it does just before the Coronation, the exhibition will be an opportunity for the British glass industry to display its resources and craftsmanship to the large number of home and overseas trade buyers and visitors who will be in London at that time. In addition to the finished products of all kinds, the exhibition will include plant, machinery, raw materials, and demonstrations of glassblowing and other processes involved in the industry.

E.I.B.A. Ball

REPRESENTATIVES of all branches of the industry, numbering over a thousand, went to Grosvenor House, London, W.1, last Friday for the annual dinner and ball of the Electrical Industries Benevolent Association. Mr. H. Drake, this year's president, accompanied by Mrs. Drake, welcomed the guests and, later, read a telegram of thanks from Her Majesty the Queen (patron of the Association) for a message of loyal greetings which had been sent to her. Telegrams expressing regret at their inability to be present from Col. B. H. Leeson, President, I.E.E., and Sir Henry Self, deputy-chairman, B.E.A., were also read. Mr. Drake thanked all those who had worked to make the evening a success. After dinner there was dancing to music provided by Sydney Lipton's Orchestra and at midnight there was a cabaret show in which Edric Connor, the Bedini Troupe of acrobats and Medlock and Marlowe took part.

This year 43 valuable prizes were given by electrical manufacturers and wholesalers and their allocation created, as usual, a great deal of expectant excitement. The British Thomson-Houston Co. provided the programmes and Venner, Ltd., undertook the responsibility for the rest of the printing and also presented a large box of chocolates to the most successful programme girl. The response to the president's appeal for contributions to the funds resulted in the collection of £145; proceeds from the sale of programmes amounted to £465.

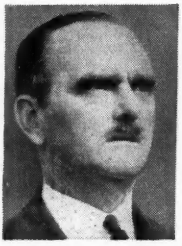
1. Lord Citrine, Col. W. M. Lapper, Mr. H. F. Carpenter and their ladies. 2. Sir Montague Hughman's party. 3. Sir John Dalton, Mrs. Wardrop and Mrs. Wayne. 4. Mr. H. A. Deacon, chairman, E.I.B.A. Court. 5. Dame Caroline Haslett and Sir John Hacking. 6. Mr. H. Senior Fothergill, secretary, E.I.B.A. (on right), with Lord and Lady Colwyn and Mr. H. Bowen. 7. Mr. and Mrs. J. Mould with Mr. E. R. Wilkinson and Mr. C. R. King. 8. Messrs. H. C. Wells, T. W. Wilcox and S. Eclair-Heath. 9. An E.W.F. party including Mr. W. H. Swain (president) and Mr. A. B. Wildsmith (director). 10. The E.I.B.A. President, Mr. H. Drake, at the microphone. 11. Mr. L. C. Sharp and guests. 12. Mr. R. Taylor's party. 13. Mrs. MacAllister and Mr. H. Towner. 14. Mr. G. Conradi's table

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE British Broadcasting Corporation announces the appointment of **Mr. J. W. M. Swanson** as engineer-in-charge, Newcastle. Mr. Swanson joined the staff of the B.B.C. in 1934 as an assistant maintenance engineer at the North Regional transmitting station at Moorside Edge. He later served as a maintenance engineer at the Newcastle studios and at the Tatsfield receiving station. He became assistant engineer-in-charge at the Monitoring Station at Caversham in 1943, and held this post until his present appointment.

Mr. S. J. Clarke, T.D., who until recently was manager of the British Thomson-Houston Co.'s Swansea district office, has been appointed manager of the company's Newcastle-on-Tyne district office in succession to **Mr. F. C. Barford,** who will shortly be taking up another position in the B.T.H. Co. Mr. Clarke was educated in Hong Kong, where he served an apprenticeship with the Hong Kong Electricity Co. Coming to England in 1930, he entered upon a course of training with the B.T.H. Co. as a graduate apprentice, and in 1933 was posted to the Swansea district as B.T.H. power engineer. Early in 1939 he was commissioned in the R.A.O.C., and from 1943 until 1945 he served as lt.-colonel with R.E.M.E. in various theatres of war, including North Africa and Italy. On demobilization in 1945 he returned to the B.T.H. Swansea office, and in June, 1948, was appointed to the managership of that office. Mr. Clarke is succeeded at Swansea by **Mr. K. M. Fox.**



Mr. S. J. Clarke

Mr. B. Donkin, B.A., M.I.E.E., a partner in the firm of Kennedy & Donkin, Ltd., consulting engineers, has been elected chairman of the General Council of the Engineers' Guild, Ltd. Mr. Donkin, who is the eldest son of the late Mr. S. B. Donkin, was educated at Greshams School, Holt, Norfolk, and Pembroke College, Cambridge. After a student apprenticeship course with the English Electric Co., Ltd., he spent some time with the company before going to the United States to join the American General Electric Co. He returned to England in 1928, and joined the firm of Kennedy & Donkin as a junior assistant engineer, mainly concerned with the initial design and construction of the 132 kV grid for the Central Electricity Board, and was made a partner in 1934. He has since been engaged upon the further extension of the grid, including the 275 kV super grid.

Mr. T. M. Megaw, M.Sc.(Belfast), M.I.C.E., resident engineer, Central Ordnance Depot, Bicester, has been elected vice-chairman of the General Council of the Guild. The chairman of the Executive Committee is **Mr. W. A. M. Allan,** A.C.G.I., M.I.C.E., M.I.San.E., M.I.S.P., and the vice-chairman, **Mr. C. L. Champion,** B.Sc., A.C.G.I., A.M.I.C.E., M.I.Mech.E., A.M.I.E.E.

Mr. Donald Williams, M.Sc., A.M.I.E.E., physicist in radio valve manufacture at the Mullard Blackburn Works, Ltd., has been appointed principal of the School of Art and Science, Frome, Somerset. Since 1946 he has been education and training officer at the Blackburn works. He has been a lecturer in physics and mathematics at the Municipal College, Burnley, since 1949.

Professor P. I. Dee has been awarded the Hughes Medal of the Royal Society for distinguished studies on the disintegration of atomic nuclei, particularly those using the Wilson cloud chamber technique.

At a recent Council meeting of the Electrical Wholesalers' Federation, **Mr. H. F. Wickham** was appointed secretary. Mr. Wickham is the son of a wholesale stationer, and has always been connected with the wholesale distribution side of industry. After serving as a wireless telegraphist in the Royal Navy he returned to the staff of a member of the E.W.F. with whom he was previously employed. He has been a member of the headquarters staff of the Federation since 1943.

Mr. H. F. Wickham

Mr. H. R. Cooper, M.I.E.E., recently relinquished his position as managing director of the International General Electric Co.

(India), Ltd., after 28 years' service in India and has joined the board of the International General Electric Co. of New York, Ltd., London. **Mr. W. M. Portrude** has succeeded Mr. Cooper as managing director of the Indian organization.

Mr. Michel Stevenin, deputy station superintendent at St. Ouen Power Station, Paris, visited the North Western Division of the British Electricity Authority from 20th to 23rd October. After being conducted around various power stations, including Agecroft and the Trafford gas turbine installation, he later visited the Manchester control room at Didsbury. During his visit Mr. A. R. Cooper, controller, invited Mr. Stevenin to discuss matters of common interest with several officers at divisional headquarters.

Discussing matters of common interest at Divisional Headquarters, N.W. Division, B.E.A. (left to right facing camera): Mr. A. R. Cooper, controller, Mr. M. Stevenin and Mr. P. H. Platt, divisional secretary

Mr. M. B. Mallett has been appointed general manager and chief engineer, English Electric Co. of Canada, Ltd. Mr. Mallett joined the company in 1941 and became chief engineer in 1948. The appointment fills the vacancy created by the resignation of Mr. A. H. Frampton, formerly vice-president and general manager.

Mr. H. J. Devaney, A.M.I.E.E., shift charge engineer at Nechells power station, Midlands Division, British Electricity Authority, has been appointed assistant boiler house superintendent at Battersea power station, and on 5th November, Mr. G. D. Clegg, station superintendent at Nechells, presented him with a Westminster chiming clock on behalf of his colleagues at "A" and "B" stations. Mr. Devaney joined the Birmingham Corporation Electric Supply Department in 1932 as a substation attendant, and was transferred to the generation department in 1939.

Mr. R. Cox, who is a director of the Yorkshire Switchgear & Engineering Co., Ltd., and London manager of the Electro Mechanical Manufacturing Co., Ltd., was recently made a Liveryman of the Worshipful Company of Tallow Chandlers.

Mr. W. C. Gomersall, M.I.E.E., chairman and managing director of the China Engineers, Ltd., the China Printing & Finishing Co., Ltd., and the Shanghai Worsted Mill, Ltd., is due to arrive in this country towards the end of December. The China Engineers, Ltd., are agents for Johnson & Phillips, Ltd., in Shanghai, Hongkong and Singapore and represent a number of other prominent British manufacturers. It is their intention to continue to maintain their offices in Shanghai. Mr. Gomersall's address is Malincourt, Copsem Lane, Oxshott, Surrey.

Mr. L. W. Postle, A.M.I.E.E., eastern counties area manager for the Electrical Apparatus Co., Ltd., has been appointed manager of the Birmingham office. His place at Ipswich will be taken by **Mr. P. J. Murray** of the company's London sales organization.

Mr. R. H. Wilson, Associate I.E.E., has joined A.B. Metal Products, Ltd., in the capacity of general manager. Mr. Wilson was formerly sales manager of the Ceramic Resistor Department of the Morgan Crucible Co., Ltd., Battersea.

Mr. L. Atherton, B.Sc., A.M.I.E.E., has recently joined the equipment division of Mullard, Ltd., to take charge of the special products commercial group which specializes in ultrasonic equipment and laboratory and industrial applications of electronic techniques. Mr. Atherton was previously at the Ministry of Supply atomic energy plant, Springfield, Preston, as head of the group concerned with the measurement and control of hazards associated with the handling of radio-active materials. During war service with the R.A.F. he was seconded to T.R.E. at Great Malvern for work on Doppler applications of radar. He was also at one time in charge of the installation of aircraft beam approach systems in South Africa. **Mr. A. E. Crawford,** A.R.Ae.S., of the equipment division, is now in charge of a special assignment to investigate applications of ultrasonic and other electronic equipment.

Mr. H. Sayers, Birkenhead, has been appointed lecturer in electrical engineering at Rutherford College of Technology, Newcastle.

Over £100 was raised at a dinner-dance in aid of the **Electrical Industries Benevolent Association** held on 7th November at the Grand Hotel, West Hartlepool. The attendance was 220, and those present included the Mayor and Mayoress of West Hartlepool (Coun. and Mrs. J. O. F. Hewlett), Mr. S. Tillotson, Tees Sub-Area manager, North Eastern Electricity Board, and chairman of the Tees Area Committee of the Association, and Mrs. Tillotson. The Mayor proposed the toast of the Association and Mr. J. R. Cameron, commercial engineer, Hartlepool District, responded. Mr. A. Phillips, of Edgar Phillips & Co., West Hartlepool, presided. Over 60 prizes were distributed.

OBITUARY

Mr. Geoffrey M. Gullick, C.B.E., chief mining director of Mavor & Coulson, Ltd., died in Sheffield on 11th November at the age of sixty-three. Since 1907 he had been engaged in applying machinery to the mining of coal.

Mr. S. B. Donkin.—It is with regret that we record the death of Mr. Sydney Bryan Donkin, the well-known consulting engineer and senior partner in the firm of Kennedy & Donkin, consulting engineers, which occurred on 12th November at the age of eighty-one. Mr. Donkin was educated at University College, London, and served a pupilage with Bryan Donkin & Co. and with Sulzer Bros., Switzerland. He later became assistant to Sir Alexander B. W. Kennedy and partner in 1913, and he became associated with Kennedy & Donkin in the following year. As senior partner of the firm he carried out the design and construction of many important electricity supply schemes, electrification of railways and tramways. Mr. Donkin was a member of the panel of technical engineers which drew up the development scheme for the North of Scotland Hydro-Electric Board, showing the water power resources, and he was also one of three engineers appointed by the Minister of Fuel and Power in 1943 to review the recommendations of the Severn Barrage Committee in the light of the conditions at that time. He was a member of the Institutions of Civil, Mechanical and Electrical Engineers and was chairman of the Association of Consulting Engineers for the years 1927-28 and 1943-44.

The late Mr. S. B. Donkin

He was president of the Institution of Civil Engineers in 1937-38, and of the Association of Supervising Electrical Engineers in 1928-31. Mr. Donkin was elected a Fellow of University College, London, in 1946.

Mr. Sydney William Melsom, M.I.E.E., who until his retirement in March, 1950, was technical officer to the Cable Makers' Association, died on 15th November at the age of seventy-three. Following an apprenticeship with Crompton & Co., during which he worked personally with Colonel Crompton, Mr. Melsom joined the National Physical Laboratory, being one of the first few members of the staff under Sir Richard Glazebrook. For most of the twenty or so years which he spent there he was responsible for the work of a section and its organization. During this time, and generally in collaboration with his assistant, Mr. H. C. Booth, a number of now classical papers on various electrical subjects were published, mainly on current rating and allied problems relating to power cables. The first paper on the subject, published in 1911, formed the basis of the revised tables on current rating in the I.E.E. Regulations.

The late Mr. S. W. Melsom

He left the N.P.L. to become head of the Research Department of Callender's Cable & Construction Co., Ltd., leaving the company in 1930. After a period devoted mainly to inventing and successful development of a new resistance element, he re-joined the cable industry in 1935 as technical officer to the C.M.A.

Mr. Melsom twice served on the I.E.E. Council for three-year periods and received three premiums for I.E.E. papers. He was chairman of the Transmission Section for 1941-42. He served on the Wiring Regulations Committee for many years and was chairman of the Cables Sub-Committee. He was a member of E.R.A. and B.S.I. Committees. During the war he was mainly concerned with cable requirements of the Services.

Mr. W. E. French, who died suddenly last week at Leeds, was head of the Department of Electrical Engineering at Leeds University until his retirement in 1946.

Domestic Water Heating

The report dealing with the use of water heating appliances in domestic establishments referred to in last week's issue (p. 1084) is National Building Studies, Special Report No. 14 (not No. 11 as stated).

Industry and the House

New Session's Legislative Proposals

By A. M. F. Palmer, A.M.I.E.E., M.P.

Mr. Palmer, who is well known to many readers, was recently returned to the House of Commons by the Cleveland Division of Yorkshire

TO a Member returning to the House of Commons after an unsought absence of some two and a half years much is all too familiar but much is changed. An obvious transformation is in the balance of the two sides of the House. In 1945–50 the Government benches were not sufficient to hold at times all the supporters of the Labour Party; often they spilled over to the below-the-gangway places on the Conservative side. To-day Government and Opposition parties confront each other in nearly equal strength, visible to the eye.

Intellectually, parliamentary life appears to be settling to a new norm more suitable to the realities of the 1950s. Confident assumptions about the future in one camp, nostalgic yearnings for the past in the other, seem to have given way to a common concentration—implied if not admitted—on the immediate present. This is reflected in the Order Paper at Question Time. The insatiable curiosity of M.P.s is now more than ever before directed to current industrial, economic and scientific topics, including a steady rain of fuel and power questions.

The new session opened with the presentation of the Government's programme in the traditional form of the Queen's Speech. This was in itself a special occasion. It is the first time that our new young Queen has had to undergo the very considerable ordeal of addressing the ceremonial assembly of both Houses of Parliament. As has been generally noted, she succeeded admirably.

The Gracious Speech contained a number of items indicating the nature of the Conservative Government's approach to industrial and commercial issues. A sharp contrast to Labour's post-war outlook is in the present paucity of legislative proposals. This is no doubt in accord with the stated view of the Conservative Party that present needs demand more concentration by Ministers on day-to-day administration in their departments and less responsibility for new law-making in the Chamber. Characteristically, therefore, the major proposals for legislation put forward are negative in form: Bills to undo the nationalization of iron and steel and road transport. The Government aspires to drive them through Parliament with the minimum of delay. But from all I hear it is difficult to suppose that the Opposition will willingly give these controversial Bills, which it dislikes intensely, an easy and swift passage.

There is a promise in the Queen's Speech to amend the Town and Country Planning Act by finding some unspecified substitute for the development charge. An unexpected incident in this connection was Mr. Churchill's slip when he confused the £900,000,000 compensation paid to railway stockholders under the Transport Act with the £300,000,000 due to be paid next year in development charges under the Planning Act. A further unusual note was struck at the same time by the Prime Minister when he spoke of shareholder compensation as a "millstone" for the railways. This view has been held hitherto by the less orthodox members of the Left. It was no wonder that a buoyant Dr. Dalton from the Opposition front bench later took pleasure in quoting from another speech of Mr. Churchill's to show that the Prime Minister had spoken in similar terms before. However, the date turned out to be the late 1900s and few would expect a politician to be decently brought to book for what he said forty years ago; many claim acquittal after four.

One intriguing short paragraph in the Speech received scant attention from the general run of speakers in the debate. It was the reference to the intention of the Government to "attentively examine" the supply of electricity in Scotland. At the moment the genesis of the proposal is obscure. It is well-known that the Hydro-Electric Board is not enthusiastically clamouring for incorporation in a single Scottish electricity authority, and that a technical justification for splitting Scotland away from the general system of control of the B.E.A. is non-existent. A commonly held view is that here is an adroit move on the part of the Government to appease Scottish nationalist sentiment; if there can be no Home Rule for the Scots, there might at least be Home Rule for Caledonian kilowatts!

The debate on the Address was moderate, almost prosaic in tone, although excellent contributions were made both by Mr. Butler, Chancellor of the Exchequer, and by Mr. Gaitskell, his predecessor. Apart from these two I thought the standard of front bench speaking decidedly below par. From the back benches, Government supporters claimed that Conservative action over the last twelve months had rescued the country from impending bankruptcy and that our affairs were now on a stabler keel. Labour speakers concentrated upon the continuing grave aspects of the economic situation—principally the drop in productivity and the falling away in exports. Behind the party forms of expression inseparable from our parliamentary system I thought most contributors were genuinely trying to find a way out of the country's practical dilemma—how to maintain a rising standard of life for Britain in a world far less under obligation to us than formerly. For that reason there is justification in the Labour claim that de-nationalization of Iron and Steel and Transport is irrelevant to the country's economic problems. However, perhaps Conservatives will reply that parliamentary debating by itself won't, in any case, find a solution.

A parliamentary paper of some interest to the electricity supply industry is the Report of the Select Committee appointed to investigate the methods by which the House of Commons is kept informed of the affairs of the nationalized industries. Lord Citrine, chairman of the B.E.A., was among those who gave evidence to the Committee.

No startling change from present practice in the matter of parliamentary questioning is recommended by the Committee, although it feels that the responsibility of deciding whether questions on nationalized industries are admissible or otherwise should no longer be left solely to those zealous officials, the Clerks at the Table. It is suggested that in future the question should in any case appear on the Order Paper and it be left to the Minister concerned to refuse to answer if he wishes to do so. This change, if adopted, may have rather wider implications than is obvious at first sight.

PARLIAMENTARY NEWS

From Our Special Reporter

IN the House of Commons Col. R. S. Clarke asked the Assistant Postmaster General how far his regulations required that, before telegraph and telephone poles which had become redundant through the lines being placed underground were handed over to the British Electricity Authority, such transfer of user was referred to the highway authorities for their agreement.

Mr. Gammans said that no general instructions had so far been considered necessary. The highway authority should of course be consulted on any proposed transfer of user, and if Col. Clarke had in mind any particular instance where this was not done, he should be glad to make inquiry.

Coal Stocks

Mr. Geoffrey Lloyd informed Sir Ian Fraser that on 1st November stocks of house coal were 2·1 million tons compared with 1·2 million tons a year ago. Stocks for power stations, gasworks, railways, and the various industries were 16·4 million tons, against 15·3 million tons. Undistributed stocks were 4·7 million tons as compared with 1·4 million tons.

Power From Waste Heat

Sir Wavell Wakefield asked the Minister of Fuel and Power what action was being taken to combine gas and electricity works, in particular at the pit-head, with a view to utilizing low-grade material on the site and for the generation of power from waste heat at gasworks and from coke breeze.

Mr. Geoffrey Lloyd said that there were no combined gas and electricity works, but the larger gasworks used their waste heat for power requirements and the electricity generating stations regularly used coke breeze where it was available.

Whose Property?

Some Legal Points on Hiring and Repairs

By C. F. MAYSON, A.M.I.E.E.

CONTRACTS for the hire or repair of equipment, like those for the storage of goods, are classified in law as "bailments." The word "bail" implies a trust and a bailee is one who holds goods or like property of the bailor on an undertaking to return them at a time or upon an event agreed between them.

A bailment, being a contract, may be upon any agreed basis, provided there is nothing illegal. In "bailments for reward" (gratuitous bailments or loans are not dealt with here) there are certain implied terms, which, unless actually or apparently excluded, govern this rather special class of agreement. The most important of these is that which determines the right to possession of the goods. The position is analogous to the letting of freehold premises; the owner retains the freehold property, but the lessee or bailee gets a special kind of property known as "legal possession" which carries with it, among other things, the right to quiet and undisturbed use and enjoyment. Unjustifiable repossession by the bailor could render him liable to prosecution for stealing; at the least, he would have to pay damages to the bailee.

The bailee must pay all charges when due. If the payment is a fixed sum for a stated period, the whole sum is payable whether or not the goods are returned before the expiration of the period. Where payment is by instalments at specified intervals, each instalment is treated as a fixed sum for the period it covers. Non-payment on the due date ends the contract, and the bailor is entitled to recover the goods and claim the moneys owing up to the end of the period (but not to the date of recovery, unless this has been hindered by the bailee).

Goods held by a bailee in the course of his trade or business are exempt from distress for rent or rates. As to loss generally, though he is responsible, he is not compelled to insure unless this is provided for in the contract; if he does so, he is accountable to the bailor for any insurance moneys.

The type of bailment of most interest to engineers is that of hire; also important is the implied bailment of goods held for repair. The former is used mainly in connection with the hire of plant and equipment, where the term of greatest interest to the hirer is the implied warranty of fitness by the owner. Apart from any special provision, the equipment must be reasonably fit and suitable for the purpose for which it is hired. This may be made known at the time of the hiring, or it may be obvious from the type of equipment. In this connection, the statutory requirements of section 17 of the Factories Act, 1937, as to the fencing of machines, must not be forgotten in appropriate cases; nor should the extension of this section to reg. 86 of the Building Regulations, 1948, be overlooked. There is a further warranty that at the time of delivery there are no defects discoverable by reasonably careful examination, of which the owner is or ought to be aware. His liability for such defects will extend to all consequential damage which would normally be within the contemplation of a reasonable person aware of the use to which the equipment is to be put.

The hirer must, on his part, take reasonably good care of the equipment, though fair wear and tear is excluded. Unless specificially authorized by the owner, he may not sub-let it, lend it, or put it to any use for which it is not intended. He is responsible for all damage due to negligence or misuse on his part or by his employees or agents.

A breach of the hiring agreement, or of the implied terms, by the hirer entitles the owner to immediate possession. Wrongful detention of the equipment enables the owner to claim rent for the whole period. Where a hirer deliberately parts with equipment, as by selling or otherwise converting it, the owner may claim its full value. But

where such detention or conversion is not the fault of the hirer but of a third party, who has obtained control of the equipment, the owner may take action against him and claim both rent and value. The recent case of *Strand Electric and Engineering Co., Ltd.* v. *Brisford Entertainments, Ltd.** serves to illustrate this. The plaintiffs lent some portable stage-lighting switchboards to the then owners of the Bedford Theatre, London, pending the manufacture of permanent boards. Before delivery of the latter, the theatre owners decided to retain the portable boards and agreed to pay rent for them. At a later date the theatre was sold to the defendants, who refused to hand over the boards either to the former owners or to the plaintiffs, on the ground that they were intending to re-sell the theatre and could not conclude a sale unless the stage-lighting could be demonstrated. Holding that it made no difference whether or not the boards were actually in use, the Court ordered them to be restored to the plaintiffs, or their value paid to them, and, because the plaintiffs hired out switchboards as part of their regular business, awarded damages to the extent of full rent for the entire period of detention.

Hire-purchase (but not credit-sales) agreements are subject to the same general rules, for they are true contracts of bailment, in so far as they are not affected by the Hire-Purchase Act, 1938, and the property remains with the owner until all instalments are paid.

Repairing Contract

A repairing contract involves not only the specific agreement for work and materials, but also an implied bailment of the article for repair. Again, the relevant general rules apply, but with the difference that the bailee's reward is the profit from the work of repair. He must take good care of the article while in his possession and is responsible for any extra repairs or necessary replacement occasioned by his own default or that of his employees. Without the owner's consent, he is not entitled to put the repair out to a sub-contractor, unless the surrounding circumstances are such that the employment of a sub-contractor is to be inferred. He may hold the goods until his charges are paid, but his lien is for those charges only and he cannot include a rent for keeping the goods; nor does the lien give him the right to sell them.

Until recently, a repairer could consider himself safe in selling unclaimed goods only after six years had elapsed, provided that, in that period, he had heard nothing of or from the owner. Under the Limitation Act, 1939, an owner in such circumstances loses not only his right to sue for the goods but also his title to them. They thus become the bailee's undisputed property after six years. In order to relieve this situation, and to enable a repairer to recover his charges, the Disposal of Uncollected Goods Act, 1952,† which became law on 1st August last, makes provision for the sale of "goods accepted in the course of business for repair or other treatment but not re-delivered"; goods held merely by way of storage or for safe custody are not included.

The Act states that a notice to the effect that repairs are accepted subject to the provisions of the Act must be prominently exhibited on the premises. Where this has been done—for otherwise the Act does not apply—and the owner has failed both to pay the repairer's charges and to take delivery or give delivery instructions, the goods may be sold. Various written notices have to be given or communicated to the owner, and the minimum period from the goods being ready to the time of sale cannot be less than 12½ months. When they are sold, the repairer is entitled to deduct his charges from the proceeds, the balance of which he must hold for the owner who, however, has no claim after the expiry of six years from the date of the sale. But a repairer who fails during the six years to account for the money or pay it over when lawfully demanded, is liable to a fine up to £100, or to three months' imprisonment, or both.

* [1952] 1 *The Times* Law Reports 939

† H.M. Stationery Office, price 6d. (Only the principal provisions are summarized here.)

New E.A.W. Branches

A BRANCH of the Electrical Association for Women was formed at Salisbury on 3rd November, under the presidency of Lady Richmond. The aims of the Association were explained by Dame Caroline Haslett, and short addresses were given by Messrs. R. R. B. Brown, N. F. Gadsdon and R. A. McCulloch (Southern Electricity Board). The chairman of the Branch is Mrs. Blyth, and the hon. secretary, Mrs. Gibbings.

A branch of the Association was recently formed at Berwick-on-Tweed. The chairman is Mrs. Sprunt, the hon., secretary, Mrs. Kippen, and the hon. treasurer, Mrs. Knox.

New Books

Factory Organization and Management. By N. F. T. Saunders, M.I.E.E., F.C.I.S. Third edition. Pp. 195. Sir Isaac Pitman & Sons, Ltd., 39, Parker Street, London, W.C.2. Price 16s.

This book, which is directed to those concerned in the running of small factories, first appeared in 1945. The third edition has been revised and brought up to date where necessary and a chapter on small-scale mass production has been added.

The new chapter is devoted largely to the subject of flow production and both advantages and disadvantages are considered. It is shown that, generally speaking, flow production can be applied successfully only in specialist factories, which leads Mr. Saunders to suggest that trade associations might look into the matter of voluntary rationalization among their members. Where batch production is the practice improvement can be brought about by attention to layout and the author gives brief guidance in this direction.—J.H.C.

Transformers and Rectifiers. Edited by E. Molloy. George Newnes, Ltd., Tower House, Southampton Street, London, W.C.2. Pp. 164; figs. 132; index. Price 17s 6d.

This is one of Newnes practical electrical engineering series of books and is mainly intended for the information of electrical engineers engaged in transmission, distribution and utilization. The work of several writers has been incorporated in the transformer section which occupies about two-thirds of the book and deals with types, connections, applications, installation, testing and maintenance of all types of power and instrument transformers.

While the work does not purport to cover the design of transformers, it does include a feature which is rather unusual in a book of this nature, i.e. a chapter on the design and construction of small transformers as may be used in a battery charger, radio set, or electronic device. The finer points of design are not covered, but the practical instructions given will enable any engineer to make a small transformer to his own requirements.

A great deal of practical information on the installation and care of transformers has been included, although there is a certain amount of overlapping in the work of some of the writers, particularly that of Mr. Pike who deals with installation, testing and maintenance of industrial transformers and Mr. Axson's section on maintenance of e.h.v. transformers. More information on safe standards of acidity, temperature and dehydrating agents would no doubt have been appreciated by the maintenance engineer. The application, operation and maintenance of mercury arc rectifiers and metal rectifiers are well covered in separate chapters from a practical angle, the notes on grid control referring to sine wave control. The book is a good investment to any works engineer or electrical man who is concerned with transformers or rectifiers.—J.L.W.

Electrical Contractor's Annual, 1952–53. Edited by J. Rosslyn-Stuart. Pp. 288; illus. E. & F. N. Spon, Ltd., 15, Bedford Street, London, W.C.2. Price 12s 6d.

This new annual has been designed, the publishers state, to include information normally obtainable only after a search though many works of reference. It has to be said, however, that it does not entirely render such works unnecessary to the electrical contractor, for he will require much more than this book will give him.

That is not to say that the matter is not good so far as it goes. There are a number of articles by well-known experts in their particular lines comprising "Estimating and Costing for Contracts" by W. E. Steward; "Installing Electric Water Heating" by Philip Honey; "The Ring Circuit Standard All-Purpose Plug and Socket" by T. C. Gilbert; "Artificial Lighting in Shops and Stores" by J. K. Frisby; "Electric Lamp Developments" by A. D. S. Atkinson; and "Television Aerial Installation" by R. C. Norris.

A "Miscellaneous Section" contains a great deal of tabular matter on installation subjects and also some information that will rarely be required by the average electrical contractor. There is also a directory section giving trade names and the names and addresses of electrical and radio manufacturers.—J.H.C.

Factory Lighting

THREE short papers on the lighting of factories were presented at a meeting of the Illuminating Engineering Society in London last week.

The principles of factory lighting were outlined by Mr. T. S. Jones, who reviewed the development of sources of light and of fittings during the past ten years, showing that the successful design of industrial lighting installations was based on common sense, trained observation and a knowledge of the performance of available equipment. The author expressed his belief that the wide range of lamps and fittings now obtainable should be sufficient for any factory installation.

Blended light was dealt with by Mr. S. Anderson, who explained how the addition of a few h.p. m.v. lamps to a tungsten lamp installation endowed the mixed light with a fresh vitality and increased the illumination more economically than would otherwise be possible; the combination bettered both the colour rendering and the efficiency obtainable.

The blend should be reasonably uniform over the working areas concerned, which requirement involved both the design and positioning of the units. The design of a fitting to ensure similar distribution of light from two separate sources of widely different forms was not easy when individual reflectors were employed and virtually impossible if a single one were used. The M.A.T. and M.B.T. range of lamps, which embodied both the discharge and filament sources in one envelope, blended the light neatly and compactly for accommodation in one reflector. With separate lamps, each in a normal dispersive reflector, sufficiently similar distributions could be obtained to avoid noticeable variation of colour on the working plane, if the lamps were mounted in pairs or groups at each lighting point, but not when they were spaced. Blended light was most advantageous when the mounting height was great, but the best proportions of light from the two sources would depend upon a number of factors.

The lighting of an explosives factory was discussed by Messrs. R. W. Middleton and W. E. Harper, who pointed out that the hazards varied and were complex. The fittings specified consequently varied with the hazard, but they were designed to prevent excessive energy transfer (by electric spark, heat, etc.) that might initiate an explosion. Since the safety regulations were so strict it was not surprising that the illumination of "danger" buildings rarely exceeded one lm/sq ft in 1937 though the average now was from 6 to 8 lm/sq ft.

Shock waves caused by explosions in adjacent buildings could damage wiring and fittings, so all pendants were made as light as possible and provided with safety suspension wires; exterior contours must be smooth to prevent accumulation of dust while the exclusion of dust was ensured by making all joints with machined faces wiped with grease. The temperature rise of all fittings in danger areas must not exceed 50 deg C with an ambient temperature of 35 deg C; the maximum permissible temperature rise of all acrylic covers was 35 deg C. Wall-mounted fittings in several danger buildings of the plant described had been replaced by exterior fittings lighting through roof-lights or windows. This arrangement made lamp replacement and maintenance more difficult, but this disadvantage was more than offset by the improvement of lighting.

Southern Rhodesian Imports

IN 1951 electrical imports into Southern Rhodesia increased in value by about 40 per cent on the previous year. The only noteworthy exception to the advance was telegraph and telephone material, in which, however, there was a big rise between 1949 and 1950. Great Britain's share of the trade as a whole was about 90 per cent. The Union of South Africa further strengthened its footing and was ahead of the United Kingdom in the cable business. The accompanying table compares values of the principal items in 1950 and 1951.

Class of Goods	1951 £ (000)	Inc. or dec. on 1950 £ (000)
Elec. cable and wire	1,525	+ 826
From United Kingdom	496	+ 194
„ *South Africa*	817	+ 436
„ *Canada*	178	+ 178
Lamp bulbs	126	+ 46
From United Kingdom	77	+ 33
„ *South Africa*	25	— 1
„ *Holland*	15	+ 10
Telegraph and telephone material and instruments	230	— 483
From United Kingdom	217	— 490
Radio material and instruments	390	+ 149
From United Kingdom	246	+ 80
„ *South Africa*	79	+ 26
„ *Holland*	24	+ 17
Elec. stoves, ranges and pts.	117	+ 20
From United Kingdom	63	— 7
„ *South Africa*	40	+ 18
Other heating and cooking apparatus	205	+ 19
From United Kingdom	152	+ 9
„ *South Africa*	48	+ 14
Other elec. goods and apparatus	862	+ 405
From United Kingdom	609	+ 267
„ *Canada*	26	+ 14
„ *South Africa*	154	+ 69
„ *United States*	62	+ 49
Batteries	245	+ 82
From United Kingdom	108	+ 32
„ *South Africa*	122	+ 41
Motors and parts	313	+ 39
From United Kingdom	146	— 12
„ *South Africa*	47	+ 37
Transformers	284	+ 109
From United Kingdom	275	+ 115
„ *South Africa*	7	— 7
Other elec. machinery	792	+ 325
From United Kingdom	754	+ 335
„ *South Africa*	35	+ 17
„ *United States*	24	+ 3

X-Raying Gas Turbine Rotors

Newly Designed Equipment

THE result of using radium or radioactive isotopes for radiographing welded steel sections of less than $\frac{3}{8}$in thickness is inferior to, and involves more time than carrying out the same examination with an X-ray tube of quite moderate power, provided the tube target can be suitably positioned. Time and production rate are of first importance in the choice of a source of radiation for this purpose in factory use. Reduction of exposure time and higher resolution have justified, on a cost basis, the construction of the 150 kV 50 c/s X-ray outfit described in the paper submitted by Mr. F. W. Waterton (Metropolitan-Vickers Electrical Co., Ltd.) at an extra meeting of the Institution of Electrical Engineers in London last week.

The paper described the design and construction of and results obtained with the equipment, which was built for examining welded gas-turbine rotors. The radium capsule method had previously been utilized because no X-ray tube was available that could be inserted up the central bore of the rotor.

The X-ray tube described was accordingly arranged with its anode supported at the end of a jacketed tube of 1in inside diameter and 43in in length to enable 70in long rotors to be radiographed with ease by inserting the tube from either end through a 1·75in diameter hole in the shaft.

A complete set of radiographs of a rotor is thus produced in less than two days, with marked improvement of definition and resolution, compared with over two weeks when using radium as the source of radiation.

The paper concludes with an indication of the performance of the equipment and its possible further development, the main disadvantage of the outfit as at present made being the large amount of space it required.

DISCUSSION

Dr. A. Nemet (Philips Electrical, Ltd.), who opened the discussion, spoke of the growing use of radiography for industrial applications, and urged that the Institution should take a more active part in bringing together users, manufacturers and persons interested in production techniques. An exploratory committee had recently been set up to consider specific training and qualifications for industrial radiographers on similar lines to the training for medical radiographers. The work described in the paper had, he said, led to a new and useful X-ray tube and it had demonstrated how the X-ray physicist and the engineer could help the production man.

Mr. C. Croxson (Armament Research Department, Ministry of Supply) said that in the radiographic examination of cylindrical vessels Continental practice was well ahead of this country's. More equipment of suitable design was needed and the advantages of placing the source of radiation inside the cylinder with the photographic films on the outside should be made more widely known to radiographers. He drew attention to the design requirements of rod-anode tubes from the radiographer's point of view.

Tube Design

It was unlikely that a single tube could be designed to meet all the various requirements. First the tube must be sealed off and free from the encumbrance of an evacuating system. Secondly, for some applications the tube must be placed completely inside the vessel which was being examined. An adjustable self-centring support would be desirable to hold the tube firmly in position: something better than the orthodox tripod support was needed. Thirdly, there must be adequate intensity of the X-ray beam at angles up to 10 deg or more on either side of a plane normal to the axis of the X-ray tube and containing the target so that the beam could be arranged to fall at normal incidence on to a circumferential weld. Fourthly, the focus must be sufficiently small. An empirical formula for the focus spot size that worked well in practice was $f = \frac{r}{4t}$ where f was the effective focal spot width in mm, r the target-film distance in inches and t the wall

thickness of the vessel in inches. Fifthly, a small hood of lead at the target end would be sufficient to intercept unwanted radiation and to give the necessary protection.

Mr. J. Hinde (Bristol Aeroplane Co.) said that the apparatus should prove useful for a variety of purposes. He was interested in knowing what focus/film distance was likely to be reached, as this matter was the subject of complaint by radiographers. The film was presumably only flat in relation to the contour of the weld and not to the circumferential run of the weld. He asked whether in the fabrication of gas turbine rotors other defects were expected, such as lack of penetration and cracks produced by contraction or other thermal causes. If so, was the equipment equally satisfactory for their detection?

Comparison with Gamma Rays

Mr. D. H. Lucas (B.E.A. Research Laboratories) said that the author had dealt a powerful blow on behalf of X-rays as compared with gamma rays. There would appear to be every incentive to carry on this development. There were a number of difficulties in getting an X-ray tube inside the cylindrical vessel as distinct from the case described, in which only the anode was inside. None of them was insuperable, however. Gamma rays had the advantage of the " lighthouse " type of emission, but he thought a conical anode instead of the normal shape would make all-round emission possible. There would also be some advantage in the reduction of the apparent size of the sources, in so far as the spot was divided into two on opposite faces and only half the width was apparent. Another disadvantage of X-rays might be the effective voltage of the emission as compared with gamma rays.

Mr. F. B. Perry (Metvick) said that the author had cleverly used two existing devices to produce a new form of X-ray equipment to meet a particular need. He had sub-divided the acceleration electron beam into a number of stages, which was a most unusual course to follow for voltage tubes below about 500 kV. He had also employed the extended target tube to a greater length than had been adopted in the past. He assumed that the two devices were complementary to one another. In other words, one needed the multi-stage acceleration in order to control the divergence of the electron beams sufficiently to give a long parallel, or nearly parallel, beam over a good distance. He had devised a lens system of high efficiency. He asked whether the author visualized cases where a tube of this kind might be taken up to 250 or 400 kV with a long target extension tube.

Mr. B. Wood (Merz & McLellan) said it was not clear to him whether X-rays could have been used for the gas-turbine rotors which had come to his notice. He asked the author if he could say exactly where the welds were placed.

Mr. R. Bentley deprecated the use of radium when iridium with a spectrum of about 400/500 kV could be employed. He pointed out that eventually exposure time would be reduced. He had recently seen work done with radioactive iridium sources in excess of 100 curies in a size smaller than the target source described in the paper.

The author briefly replied.

Peat-Burning Gas Turbine

IT is announced by the Ministry of Fuel and Power that an open cycle internal combustion gas turbine to burn peat has successfully completed its initial test run at the works of the makers, Ruston & Hornsby, Ltd., of Lincoln. The 750 kW turbine has been built under contract to the Ministry of Fuel and Power as part of the research programme into the utilization of peat resources (which is proceeding in collaboration with the Scottish Home Department, with the general advice of the Scottish Peat Committee).

During the tests powdered peat was used, the Ministry states. A system of feeding the peat and controlling its flow into the combustion chamber has been developed which enables the plant to be run as steadily with this fuel as with oil. Using the experience gained in these initial tests, the plant is now being prepared for prolonged running.

An advantage claimed for this machine is that the hot exhaust gases are available for drying the peat; the quantity of heat is insufficient to dry the peat from the raw state when it contains about 90 per cent of water, but the plan is to run the turbine in association with a special press designed to remove about two-thirds of the water from the raw peat. This system permits peat to be won independently of weather or season, which is in contrast to the conventional methods of employing air drying. It is intended that the programme should culminate in transferring the turbine to a Scottish peat bog, where it will be combined with a press and a dryer which are on order.

Grid-Line Stringing

East London Railway Crossing

THE erection for the British Electricity Authority of a new 132 kV overhead power line by the J. L. Eve Construction Co., Ltd., is now entering its final stages. This double-circuit line, which runs from Brunswick Wharf through the heart of East London to Brimsdown, is being strung with 0·4 sq in grease-impregnated s.c.a. conductor. An interesting stage of the operation was the stringing of the six primary conductors and earth wire in the span which crosses the main British Railways, Eastern Region, Liverpool Street–Shenfield–Norwich line at Stratford.

At the point at which the overhead line crosses the railway, which is claimed to be one of the busiest sections in the world, over which run up to 900 trains a day, there are nine tracks, five of which operate on a 1,500 V d.c. overhead system. It was therefore necessary to take special precautions to minimize dislocation of the railway services.

The electrified railway lines can be made dead for only three-quarters of an hour during the night under normal conditions. Negotiations were therefore opened with the Railway Executive which co-operated by substituting steam passenger trains in place of the electric services during the night so that the overhead lines could be made dead from approximately 12.45 a.m. to 4.15 a.m. On this basis, and by detailed organization of the work, it was found possible to erect and sag two primary conductors on each of three consecutive nights, and the earth wire during a shorter period on the fourth night.

Floodlights were installed above both towers upon specially erected scaffolding to enable the work to be carried out under the most advantageous lighting conditions possible and floodlighting was also provided throughout the intervening 990ft span which crosses two steel stockyards and a road.

The actual sagging operation was carried out by extinguishing all the above lighting, some 12 kW, and floodlighting the sagging board only, the position of the conductor being determined by means of two red lights which were attached to it before erection at the calculated position of maximum sag. Observation of these special lights during sagging was made by means of a telescopic gunsight attached to the

Above: **View showing the B.E.A. Brunswick Wharf-Brimsdown 132 kV overhead power line crossing the electrified railway tracks**

sighting tower and trained on the sagging board on the other tower.

Temporary blocks on the movement of rail traffic were imposed at certain stages of the work of erecting the overhead line, the time being kept to the minimum by controlling and co-ordinating operations by means of " walkie-talkie " equipment.

Although some fifty steam trains passed by each night during the working period, none was delayed by more than a few minutes.

We are indebted to Mr. H. V. Pugh, M.I.E.E., M.I.Mech.E., Controller, London Division, B.E.A., for the above information and the illustration.

"Antiquated" Lighting Systems

Criticisms at Scottish Conference

THE fact that in this age of television, jet propulsion, and atomic research many local authorities still employ lamp-lighters to go around switching street lights off and on was commented on by Mr. J. R. Brodie, lighting engineer, who presided at the annual conference at Prestwick on 7th November of the Scottish Section of the Association of Public Lighting Engineers. He was speaking on " The Economics of Street Lighting."

It was tragic to see throughout Britain to-day many cities, towns and villages still with the most antiquated systems of lighting. Public lighting was one of the few services still under local control and it was the one that often suffered first when economies were demanded. It could, however, no longer be considered a parochial service, and some scheme of regional control under Government grant, on a par with the police and fire services, might be the solution.

Tax on Safety

He suggested that local authorities should strongly appeal to their M.P.s for the abolition of purchase tax on lamps. " The Government pays practically nothing towards the cost of lighting the roads and actually taxes public lighting by this outrageous imposition on one of the most important and essential items required for the service," he said.

Mr. Brodie deplored the tendency of many local authorities to make small monetary savings by lowering the standard of public lighting. No authority could reduce standards set for police, fire, housing, education and health services without the consent of central departments. In the case of public lighting, local authorities could do what they liked. That was the principal reason for apathy. Reducing the standard of lighting was a retrograde step which could not be reconciled with the lip service paid to accident prevention.

Financial Assistance Needed

Advocating that local authorities should demand that lighting should be included among other grant-aided schemes, he said that some might consider this to be a further reduction in local autonomy. But in his opinion many towns had neither the funds nor sufficiently efficient lighting departments to be responsible for lighting main traffic routes.

In an address on " Airfield Lighting in Relation to Street Lighting," Mr. A. M. Campbell, of the Scottish Division of the Ministry of Civil Aviation, said that as airfield lighting improved the risk of interference from the glare of street lamps was becoming less. The main risk of confusion at present seemed to be in the airfield approach lighting system where similar kinds of lamps were being used for both the airfield and the streets.

Members attending the conference later visited Prestwick Airport and in the afternoon saw a demonstration of Coronation lighting in Ayr Civic Theatre where Mr. J. F. Roper, area engineer of the Lighting Service Bureau of Scotland and of E.L.M.A., addressed them on " Lighting for the Coronation."

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Gas *v.* Electric Cooking

WITH reference to the recent correspondence in your columns concerning electric cookers, I think the following points are worth stating:—

1. We cannot make electric cookers cheaper than gas cookers so we must make them better.

2. Cooking by electricity at 1d per kWh is cheaper than gas, and complaints of cost are practically nil.

3. The slowness of hotplates is greatly exaggerated, but nevertheless loadings of 2 or better 2¼ kW should be standard. The present solid plate badly needs re-designing to give longer life, freedom from rust and surface scaling, and above all, a firmly fixed mounting relative to the hob. " Simmerstats " should be standard fittings.

4. There is nothing wrong with telling people to buy good quality flat bottomed cooking utensils. A good set will last a lifetime and they are cheaper in the long run anyway.

5. The grill-boiler is out of date and should be replaced by an efficient separate grill with easily replaceable elements. " Clip-in " elements after the style of electric fires might be the answer.

6. Cooker panels are a needless expense. A double-pole switch on the cooker switch panel, and preferably a 13 A switched socket outlet also, would be cheaper and better. I.E.E. Regulations on this subject want amending.

7. Oven thermostats are reliable, but pilot lamps are not. These lamps must have a longer life and should be firmly fixed so that they cannot become loose.

8. White, or at any rate, light oven and grill chamber interiors must be produced. (My oven has a white interior, so it can be done.)

9. Castors should be fitted on all cookers. They could, with advantage, be designed with a coil spring mounting to allow for uneven floors.

10. The multitude of colours of standard cookers is unnecessary. Cream or white are most preferred. Light hobs wear badly, black is much better.

This list is enough to go on with, but could be extended. If we want the electric cooker load, we have got to provide better cookers. I think both the manufacturers and supply authorities are too timid in this matter. If all the improvements I have listed were carried out, a cooker could still be produced for sale for under £40. Perhaps some manufacturer would like to have a go.

HERETIC.

HAVING read the correspondence on this subject may I as a husband as well as an electrician express my views in favour of the electric cooker. Although an electrician I am not biased in my selection; I base my opinion on actual experience of cooking, including such things as Christmas cakes, pastries and meats. The main reason for my preference is cleanliness. I have had both gas and electric cookers, so I am well versed in the good and bad of both.

I think this letter will answer one of your readers who asks for things to be brought into focus. I also have a two-ring gas plate in case of an electricity cut, but I still would not go back to a gas cooker.

SPARKS.

I TRUST that " Peacemaker's " letter in your issue of 7th November will draw reasoned comment from your editorial staff. In a minor way, I wrote a letter on similar lines some months ago, drawing attention to this subject, but no one showed interest.

It is normal practice to use a combination cooker on the Continent and, in Paris, we have a cooker, constructed with an electric oven, two gas boiling rings and one electric hotplate; it is perfect except that the grill is inconveniently placed in the roof of the oven instead of on the underside of the electric hotplate. In London, we have an electric cooker which is admirable in all respects except that no gas ring is available.

I assume that it is the fact that the electricity and gas undertakings are the principal avenues of distribution of cookers which impels manufacturers to range themselves behind one flag or the other; surely the user's convenience should take first place especially now that the industries are both nationalized?

It would be interesting to know if any electrical expert can point out the advantages of an electric boiling ring over a gas ring, and if any gas expert can show any superior feature of the gas grill over the electric grill; in the latter case, I have found that one can always tell the difference in the method of grilling and it is always to the disadvantage of gas.

London, W.1. F. P. D. SCOTT.

Too Much Specialization?

I WONDER how many other engineers in the electricity supply industry are dismayed by the pattern of organization which the Area Boards seem finally to have adopted. I refer to the splitting up of the staff into specialist departments very often at a level remote from that of the primary and most important unit of organization, the District. A glance through the "Situations Vacant" columns will make clear to those who do not usually scan them just how far this trend has gone. Posts recently advertised include construction, operation and maintenance, planning, meters, testing and protection. Oddly enough the last three functions are included in one post the occupant of which is also supposed to be able to carry out fault location.

There are, of course, obvious reasons why the functional organization has its advocates. It appears to effect an economy of expensive equipment and to increase the efficiency of the staff by specialization. To most of us who have to work within this type of organization it is, however, becoming clear that the many disadvantages completely outweigh the advantages. It would be only too easy to take up a great deal of space going into details but I would like to put forward two constructive suggestions.

The first is that all engineers, including those at District level, should be given credit for having a more than superficial knowledge of every function involved in supply engineering. The second is that these men should then be given the whole responsibility for engineering work in the industry and that where advice is sought it should be given by specialists who would be regarded purely as consultants. It is not suggested that we should cease to have a central engineering policy or that we should give up the very reasonable standardization of equipment which has been achieved.

I came into the supply industry before it was nationalized, integrated, disintegrated and laid out in neat little units. I came into it completely of my own free will and with the idea of becoming not a testing engineer, a meter engineer, a planning engineer, a construction engineer, or any one of all the fascinating occupations which is now offered, but a supply engineer in the fullest sense. During my short span of years in the industry I have had no reason to change my mind. Because of this my aim for promotion must be in the direction of a District engineer or even perhaps manager. But which way do I turn?

Apparently I must commit myself to one of the specialist branches and lay myself open to the criticism that my all-round experience is not good enough. Is it conceivable that anyone is going to be able to change his course from one department to another? Much more likely, be he brilliant or just doggedly competent, he will find any specialist job a blind alley. It may be that in my case ambition may outrun ability and that lack of that alone may retard promotion, but there must be some who will be worthy of high standing. Where are the future leaders of the industry and what is their path to the top? If it lies through a specialist branch is not this in itself a bad thing for the future of our industry?

The importance of the District lies in its direct contact with the consumer. So far as he is concerned the whole of the Electricity Board is represented by the District manager and his staff. Anything which makes a consumer aware that the manager is not in full local control leads him at once, rightly or wrongly, to accuse us of the worst forms of bureaucracy. This is a problem any industry, whether nationalized or not, has to solve and its solution lies only in considerably more decentralization than our Area Board chairmen have yet had the courage to apply.

DISTRIBUTION ENGINEER.

Questions on Nationalized Industries

HOW far Ministers can be questioned in the House of Commons about the nationalized industries for which they are responsible has been a problem for some time. A Select Committee of the House has considered the matter and has now reported. (H.M. Stationery Office, 9d; Ref. 332.)

Evidence was heard from the chairmen of the national boards, among them Lord Citrine of the British Electricity Authority. Lord Citrine said that one of the greatest difficulties in a big organization, whether " private " or " national," was to get people to take responsibility. The B.E.A. had striven for four years to get people to realize that they could not expect everything to be done at the centre.

If questions were asked in Parliament on ordinary day-to-day matters a " Civil Service " mentality would be engendered where everybody would seek to get somebody else to take responsibility. Similar opinions were expressed to the Committee by Lord Hurcomb, chairman of the British Transport Commission, and Sir Hubert Houldsworth, chairman of the National Coal Board.

The Committee, in its report, says that the activities of the nationalized industries involve large-scale commercial transactions and it is desirable that they should not be unduly hampered by external interference. On the other hand, it is urged that the nation has become owner of the enormous assets involved in these industries and it is widely felt that there should be means of inquiry and criticism. Opportunities for this arise for Members of Parliament in debates on the annual reports of the various corporations but the Committee intends (if it is reconstituted) to consider whether additional machinery ought to be established to meet this problem.

As the nationalized industries are not subject to direct control of Ministers in matters of individual detail the Committee considers that without altering the terms of the statutes under which the public corporations are constituted Parliamentary questions on matters of detail are inappropriate.

It is felt that the onus of deciding what questions should be placed on the Order Paper should not rest on the Clerks at the Table of the House. It should be left for Ministers to decide whether to answer questions or refuse to answer them. In this connection the Committee recommends that the number of questions permitted to be set down by members for oral reply shall be reduced from three to two a day.

Training in Industry

THE City and Guilds of London Institute considers that in certain branches of industry additional encouragement and recognition could usefully be given, at a higher level than that represented by its full technological certificates, to those engaged in industry who continue to pursue their studies.

The Institute therefore proposes to establish under its Royal Charter an Insignia Award in Technology which will lay emphasis upon technical training based primarily upon practical experience, supplemented by theoretical study, as distinct from the more academic approach to training for which many educational facilities and inducements already exist. This award is intended to be a mark of distinction for those who have combined with a sound practical training an adequate knowledge of the fundamental scientific principles of their industry, and who possess a capacity for leadership and administration.

The standard of the award will be well above that of any existing full technological certificate and the Institute intends to introduce it gradually as opportunity offers in the main branches of the chemical, constructional, electrical mechanical and textile industries. The co-operation and assistance of representatives of industry will be sought in judging the eligibility of candidates, so the award will be indicative of exceptional competence and will ensure that persons receiving it will be recognized as being both trained and qualified to occupy posts of technical and executive responsibility in the class of work and in the branch of industry specified on the warrant they will receive.

Regulations governing the scheme, together with notes for the guidance of candidates, and an application form for the registration of candidates are available by sending a stamped addressed foolscap envelope to The Director, Department of Technology (I.A.), 31, Brechin Place, South Kensington, London, S.W.7.

On the occasion of the recent yearly meeting of the Institute, the Duke of Edinburgh, president, presented foundation awards in inauguration of the new Insignia to eleven recipients among whom was Mr. L. M. Jockel, who was awarded the Insignia in Electrical Industries—Power Engineering.

WORLD POWER STATISTICS

Resources and Production

THE sixth edition of the Statistical Year Book of the World Power Conference (1948–50), the third since the war, is now obtainable at 35s from the central office of the organization, 201–202, Trafalgar Square, London, W.C.2. In it are tabulated figures relating to fuel and power resources and their annual production and consumption for each country making returns, Eastern Europe and China having perforce to be omitted. Different sections are allocated to solid and to crude and refined liquid fuels (including proved and probable reserves), natural and manufactured gas, water power and electricity supply. Each section is introduced by an explanatory memorandum.

The United Kingdom heads the list for proved reserves of coal (no figures for the United States having been returned) with 171,400 million tons. Second comes Western Germany with 62,000 million tons of hard coal and 27,000 million tons of brown coal and lignite. Annual production (1951) follows the same order in Europe, with 226 million tons in Great Britain and 119 million tons, plus 85 million tons of brown coal, in Germany. These figures compare with 520 million tons of coal in the United States.

Electricity Supply Data

Of a total of 163 pages in the volume, 46 are allocated to electricity supply. The most recent summarized world figures (with the same omissions as before) relate to 1949, when 706,000 million kWh was sent out from power stations, 59 per cent of which were fuel operated and 41 per cent hydraulic. North America's share of the total output was 402,000 million kWh (65 per cent from fuel) and Western Europe's 217,000 million kWh (59 per cent from fuel). Production in thousands of millions of kWh in 1950, including that of industrial plants (shown in brackets), was: United States, 388 (59); United Kingdom, 55 (3·4 mining and traction plants only); Canada (1949), 51 (7); Japan, 45 (7); Western Germany, 42 (17); and France, 33 (10).

Countries using the most water power (in 1950) generated the following amounts in thousands of millions of kWh in their hydro-electric stations: United States 101, Canada 43, Japan 38, Italy 22, Norway 18, Sweden 17, France 16 and Switzerland 10.

Particulars of electricity consumption include power used for traction, electrochemical production, electric furnaces, other industries and (undifferentiated) for commercial, agriculture and domestic premises and small motors.

SOUTH AFRICAN NOTES

From Our Cape Town Correspondent

LOCAL authorities in the Cape Western Province have been informed by the Electricity Supply Commission that electricity charges will be increased by 20 per cent, probably from the beginning of next year. In the province "Escom" sells most of its power in bulk to local authorities who in turn distribute it to consumers.

Cape Town City Council may be faced with a deficit of £160,000 in revenue from electricity when it comes to balance its budget shortly. A warning to this effect was given by a member of the Finance Committee at a Council meeting. At the end of last year, to prevent an increase in the city rates, the contribution from electricity revenue was raised from £100,000 to £210,000 and to do this electricity charges were advanced to all but domestic consumers. Now it is expected that domestic charges will follow suit.

Electric trains will not run between Cape Town and Paarl until at least the middle of next year. It is expected that the electrification of the line will not be completed before next June. Delays in the arrival of equipment are holding up the work.

Sir George Usher, chairman of International Combustion and Aberdare Cables, both in Port Elizabeth, has announced that the two companies are to spend about £250,000 on factory extensions. He also revealed that during September the orders placed with one of the firms were worth over £2,000,000.

The South African Coal, Oil and Gas Corporation, Ltd., in the Orange Free State, is building a power station with a generating capacity of 40,000 kW. It will use 1,800 tons of fine coal a day and most of the steam is to be used for processing. The boilers are being made in the United States.

Commerce and Industry

Wages in the Contracting Industry

Arrangements for 1953 *B.I.F.*

AN agreement between the National Federated Electrical Association and the Electrical Trades Union provides for an increase of 2d an hour in the wages of journeymen electricians employed in the electrical contracting industry as from 17th November. Consequential adjustments are made in the rates of pay of other classes of operative.

Journeymen electricians' hourly rates are now as follows:—Grade "A" Area, 4s; Mersey District, 3s 8d; Grade "B" Areas, 3s 7d. The rates for adult mates are:—Bristol, 3s 0¼d; London, 3s 4¼d; Mersey District, 2s 11¼d; all other areas of England, Wales and Northern Ireland, 2s 10¼d. The rates for employees under 21 years of age (Categories I, II and III) and for apprentices returning from National Service are proportionately increased.

Cable Making Industry Award

The Industrial Disputes Tribunal has made an award (No. 268) in respect of the claim of the trades unions represented on the Joint Industrial Council for the Electrical Cable Making Industry for an increase in wages for all workers coming within the J.I.C. Schedules of Occupations. The award, which is dated 7th November, states that the rates of wages of the workers concerned shall be increased by 2d per hour for men and 1½d per hour for women, with corresponding increases for juvenile workers. This award is effective as from the beginning of the first full pay period following 7th November. The formula relating to payment by results systems agreed by the Council on 31st January, 1951, is maintained, it being understood that the "standard time working rate" referred to therein shall be the new time workers' rate as now established, inclusive of the foregoing advances. The fall back rate for payment by results workers will be the appropriate time workers' rate. Payment by results workers will not receive enhanced bonus earnings as a consequence of the foregoing advances, apart from any adjustments which may be necessary to payment by results systems applied to direct production workers in order to conform to the formula of 31st January, 1951.

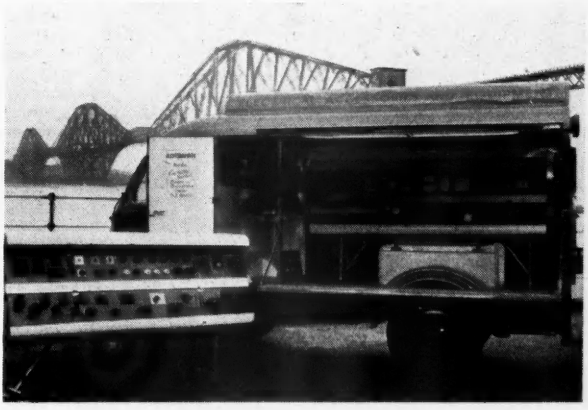
Australian Import Concession

When the Australian Government instituted a quarterly quota system for imports last March goods already ordered were admitted but any surplus above quota was debited in a subsequent quarter. It was announced last week that the Australian Government had decided to remove this condition and accordingly importers will be able to apply for licences up to the full amount of their quotas for the first quarter of 1953. It is stated that the concession has been made possible by the substantial improvement in Australia's external trade balance.

Ediswan Demonstration Van

The accompanying picture shows a demonstration van of the Edison Swan Electric Co., Ltd., which is now touring the country for the

A demonstration van for displaying Ediswan "Clix" electrical accessories which is now touring the country



purpose of displaying "Clix" electrical accessories to architects and other users. The van contains a wide selection of accessories, and is in charge of an experienced technical representative who can advise on the use and availability of all the items displayed.

Power Convention Proceedings

A full report of the proceedings at the fourth British Electrical Power Convention held at Bournemouth last June has been published from Convention headquarters, 16, Stratford Place, London, W.1, in a bound volume of 480 pages. It includes the presidential address by Mr. P. V. Hunter, the Convention papers and discussion, speeches at the annual dinner, a report of the "Electrical Forum," the annual report and annual general meeting and the list of delegates. The price of the volume is 12s 6d.

Indian Conduit Complaint

The Electrical Contractors' Associations of Bombay and West Bengal have protested to the Indian Ministry of Commerce about the ban on the importation of electrical conduit. It is reported in the *Indian Electrical Contractor & Trader* that the secretary of the West Bengal E.C.A. says that locally-manufactured conduit is of very poor quality; even when it is made from 16 or heavier gauge it does not withstand bending and threading. "The welding generally bursts and dies are destroyed very easily. Due to the inability of the local manufacturers to carry out enamelling, the conduit rusts very quickly and the threaded ends normally give way, leaving the wiring exposed."

The Poultry Show

At the National Poultry Show which opened at Olympia yesterday (Thursday), the exhibit of the Electrical Development Association is entitled "Chicken in the Kitchen," where, in an electrically equipped kitchen, Miss Marguerite Patten, the B.B.C. television cookery expert, assisted by demonstrators from various Electricity Boards, is giving a series of demonstrations illustrating new and unusual ways of preparing meals incorporating eggs and poultry.

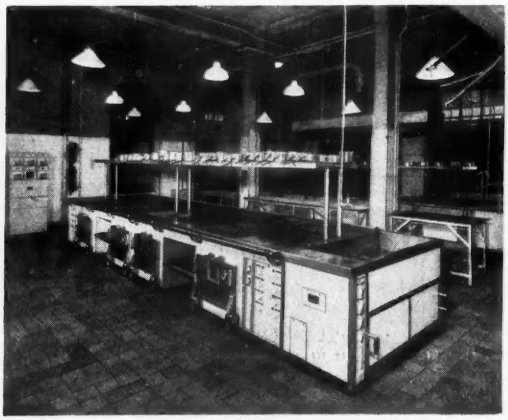
Accommodation for an audience of about 60 persons is provided in front of the demonstration kitchen, behind which is another kitchen for preparing the food for cooking. The public has access to both kitchens to inspect the various electrical appliances being used in the course of the demonstrations. The exhibition, which closes to-morrow (Saturday), has been organized by *Poultry World* and *Farmer and Stock-Breeder*.

Electric Ranges at Hotel School

The London County Council has recently installed two multi-oven electric ranges in the kitchens of the Westminster Technical College Hotel School. These ranges, designed and built by the General Electric Co., Ltd., replace two gas heated types which had been in service for a number of years. The larger of the two ranges, which are built as island units, is installed on the ground floor of the College and has a total loading of 159·5 kW. It has eight ovens with boiling plates over and intermediate boiling tables along one side. At one end an open bath bain marie with a hotcupboard underneath is provided. Each oven is heated by means of sheathed wire heating elements, which have a total loading of 3·5 kW. Separate heat control is provided for the elements which are situated in the top and bottom of the oven. To enable students to become familiar with alternative forms of oven heat control, four ovens on each range are fitted with thermostatic control and four with 3-heat switch control. Over each oven, and in each intermediate boiling table, four separate anti-drip boiling plates each loaded to 2·5 kW are mounted. These are controlled in pairs by 3-heat switches. There are four main control panels.

The bain marie fitted over the hotcupboard is heated by sheathed wire immersion heaters to a total loading of 9 kW, fitted in the bottom of the bath, and the hotcupboard is heated by elements, with a maximum loading of 2·5 kW, fitted under removable cover plates in the bottom of the cupboard.

The smaller range is installed in



G.E.C. multi-oven electric range in the ground floor kitchen of Westminster Technical College

the kitchen on the first floor and has a total loading of 139·5 kW. Like the larger unit it has eight ovens, and a bain marie with hotcupboard under, but only two boiling table sections. Both ranges were erected on site by G.E.C. engineers and the installation was under the direction of Mr. J. Rawlinson, chief engineer and Mr. Forbes Jackson, deputy chief engineer to the London County Council.

Window Display Competition

The winners of its national window display competition have been announced by the Rawlplug Co., Ltd. The first prize of £100 has been awarded to Goulds (Shanklin), Ltd., Mr. V. W. G. Turner, the manager, receiving the first prize of £10 for window dressers. The winner of the second prize of £50 was Alfred Alby, Ltd., Ramsgate (second prize of £5 for window dressers to Mr. W. Darby), and the third prize winner (£25) was Milton Syer, Ltd., Peckham, London, S.E.15 (third prize of £2 10s for window dressers to Mr. J. A. Dear).

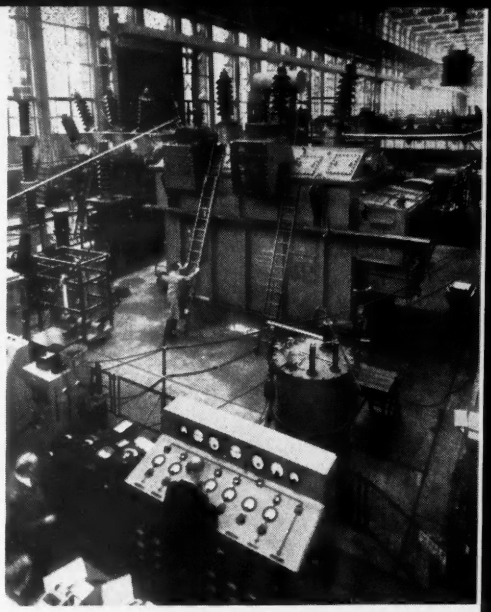
British Industries Fair

Next year—Coronation year—a number of new features will be introduced into the British Industries Fair (27th April to 8th May) and for the first time since the war all three sections will be open to the public every afternoon and all day on Saturday.

The three sections (Olympia and Earls Court in London and Castle Bromwich, Birmingham) will occupy a floor space of some million square feet and about 2,000 manufacturers in 80 industries are participating. It is calculated that the preparation of the Fair involves 10,000 electric lighting fittings, 1,000 miles of wiring and 6,000 telephones. Electricity consumption is put at 4 million kWh.

A Large Transformer

On Friday last a transformer of special interest built by Ferranti, Ltd., left the company's Avenue Works, Hollinwood, for Leeds, to be installed at Low Road substation for the Yorkshire Electricity Board. It is a 100 MVA, 3-phase 132/33 kV star/delta connected transformer, and is provided with on-load tap changing gear on the 132 kV winding of the continuously rated reactor type. It has a self-cooled rating of 50 per cent and is provided with two banks of air blast cooled radiators with forced oil circulation. It is of interest to note the following voltage tests applied to this transformer:—Impulse test voltages: high voltage, 550 kV, low voltage, 200 kV. Over-potential tests: high voltage, 372 kV, low voltage, 93 kV. The weight of the load, including trailer, was 172 tons, added to which there were three tractors each weighing 9 tons, making a total weight of 199 tons. The overall length of the convoy was 132ft. This



A 100 MVA transformer being finally tested at Ferranti's works before being dispatched to Leeds for the Yorkshire Electricity Board

transformer is one of two units ordered, and when installed will be the largest transformer in service in Great Britain.

Prices of Materials

In the accompanying table we give the prices of the more important materials used in the electrical industry. The figures are those quoted on Monday last.

ALUMINIUM Ingots	ton £166 0s 0d
COPPER, H.C. Electro	ton £285 0s 0d
Fire Refined 99·70 per cent ..	ton £282 10s 0d
Fire Refined 99·50 per cent ..	ton £274 0s 0d
COPPER Tubes	lb 2s 8½d
Sheet	ton £339 0s 0d
H.C. wire and strip	ton £317 15s 0d
LEAD, English	ton £96 10s 0d
Foreign	ton £95 0s 0d
MERCURY	flask £79 10s 0d
TIN	ton £967 0s 0d
ZINC, G.O.B. Foreign	ton £110 0s 0d
Electrolytic	ton £114 0s 0d
BRASS Tubes	lb 2s 2¾d
Sheet	lb 2s 5¾d
Wire	lb 2s 8¾d
PHOSPHOR BRONZE	
Wire	lb 4s 1¾d
RUBBER, No. 1 R.S.S. spot ..	lb 24¾ 24¾d

Works Visit

On 22nd October members of the Catering Equipment Manufacturers' Association paid a visit to the Hobart Manufacturing Co.'s assembly plant at New Southgate, N.11. Over 40 members attended and were received by Mr. N. J. Glanfield, managing director, who gave a short

explanatory talk on the plant, emphasizing that the Southgate plant was for assembly only and constituted approximately one third of the British organization, the main engineering works being situated in North Devon. The party was divided into small numbers and under the guidance of senior executives made a complete tour of the offices and works. The afternoon ended with the visitors being entertained to tea in the conference room during which Mr. J. C. Morris (director of Benham & Sons, Ltd.), extended a vote of thanks to the Hobart Manufacturing Co. on behalf of C.E.M.A. members.

Membership of B.R.A.

The British Refrigeration Association informs us that in an action which it brought against the Hertford Refrigeration Co., Ltd., W. M. Lewis & Son, Ltd., and Abage (Fulham), Ltd., Mr. Justice Danckwerts on 14th November granted an interlocutory injunction restraining the defendants and each of them by their servants, agents or otherwise, from representing in any way that they are members of the British Refrigeration Association.

Aluminium-Sheathed Signalling Cable

The Southern Region of British Railways is introducing colour light signalling on the central sections of the Victoria–Brighton and London Bridge–Brighton lines to replace the present semaphore signalling system, and to link up with existing installations, thus providing continuous colour light signalling throughout both routes.

For Stage II of the conversion, between Battersea Park and Selhurst on the Victoria line, British Insulated Callender's Cables, Ltd., supplied what is believed to be the first length of aluminium-sheathed paper-insulated cable to be used purely for signalling purposes. The length of the cable was 3,500 yards and the corrosion proofing was arranged for installation in the new Southern Region standard concrete troughing.

B.I.C.C. also supplied 6,500 yards of two-core paper-insulated lead-sheathed feeder cables with conductors of 7/·064in and approximately 200 core-miles of multi-core vulcanized-rubber-insulated, lead- or bitumen-sheathed cable, varying from 5 to 36 cores.

Kitchen Planning

A profusely illustrated brochure entitled "Electric Kitchen Planning," of interest to those concerned with planning a new kitchen, adapting a kitchen to changed family conditions, or modernizing an old one, has been published by the British Electrical Development Association. The layout of small, medium and large kitchens is discussed, including the "dining-kitchen," with much valuable advice on the arrangement of the various items of equipment and choice of lighting. A special feature is the 16 pages of photographs as well as a number of reproductions of plans illustrating kitchen arrangement, and showing how to make the most use of the space available. Copies of the brochure are obtainable from Electricity Boards or direct from E.D.A., 2, Savoy Hill, London, W.C.2.

Diesel-Electric Locomotives for Ceylon

At the Brush Works, Loughborough, yesterday, the first engine of a £1,000,000 order for twenty-five diesel-electric locomotives for Ceylon was to be formally handed over by Sir Ronald Matthews, chairman of the Brush Electrical Engineering Co., Ltd., to the High Commissioner for Ceylon.

R.I.C. Dinner

The Duke of Edinburgh will propose the toast of "The Radio Industry" at the annual dinner of the Radio Industry Council to be held at the Savoy Hotel, London, on 25th November. He will be introduced by Lord Burghley, president of the Council, and the response will be by Mr. G. Darnley Smith, chairman, R.I.C. Lord Burghley will propose the toast of the guests and Mr. A. T. Lennox Boyd, M.P., Minister of Transport and Civil Aviation, will respond. Among the distinguished guests will be the Postmaster-General, Earl De La Warr; the Paymaster-General, Lord Cherwell; the chairman of the board of governors, B.B.C., Sir Alexander Cadogan; and the Director-General, B.B.C., Lt.-Gen. Sir Ian Jacob.

E.C.A. Southern Section

Replying to the toast of the Electrical Contractors' Association, at the annual dinner of the Southern Section held at the Polygon Hotel, Southampton, recently, Mr. W. T. Trace, president of the E.C.A., said that almost everybody had got into the habit of accepting second best. That had to be stopped, but the change could not be made by the Government or by any other organization alone. It had to start with the individual. He acknowledged that the contracting industry had labour problems with no hope, he felt, of any speedy relief, but they possessed a wonderful Association. It had its critics, but so long as criticism was constructive they had nothing to fear. Apart from the aims, objects and ideals of the Association, there were many practical benefits to be derived from membership. One was the knowledge that the public regarded members as men of integrity.

Mr. A. E. Marsh-Hunn, who proposed the toast of the Association, spoke of the high standard it maintained within the electrical industry and of its ability to deal fully with all the problems that came within its sphere. Speaking of industrial relations, he said they had

deteriorated in recent years, due, in his opinion, to a lack of faith in each other. If we were to save the country from economic depression we had to get together and increase production.

Switch Factory Extension

An extension to its factory in West Molesey, which includes a new administration block, is nearing completion by Arcolectric (Switches), Ltd. The complete factory will have a total floor space of about 18,000 sq ft. This extension will enable the company to expand output to meet the rising demand for switches and signal lamps.

Management Conference

The autumn conference organized by the British Institute of Management was held from 13th to 15th November at Harrogate, and was attended by over 600 managers. A number of papers by leaders in various branches of industry were presented, and the steps which were being taken to meet economic and industrial problems as they affect individual companies and the prosperity of the country as a whole, were discussed. Among the many matters which were dealt with were economic and financial problems; training methods; industrial relations and incentives; sales management; organization; and production and office methods.

Fluorescent Stage Lighting

For a recent special production of operas by the Welsh National Opera Company at the Sophia Gardens Pavilion, Cardiff, Thorn Electrical Industries, Ltd., were commissioned by the Cardiff Entertainment Committee to provide the whole of the stage lighting. This included a four-colour fluorescent cyclorama batten, a four-colour fluorescent ground row, two four-colour fluorescent battens and six four-colour fluorescent wing floods, all dimmer controlled; one twelve-way tungsten filament spot bar; four 1,000 W front of house spots; four 1,000 W fore stage spots; four float spots; six 1,000 W pageants and flame and cloud effect lanterns. The use of fluorescent lighting enabled the drama director (Mr. John Moody) to employ spectacular high intensity colour effects without discomfort to the artists from glare or heat.

Sydney Switchgear Orders

The Sydney *Sun* reported on 10th November that the Sydney County Council had been refused an import licence for more than £100,000 worth of electrical equipment from England. The Council had therefore decided to divide an order for 150 sets of metalclad switchgear for substations between two Australian manufacturers—Australian General Electric and Westinghouse, Rosebery, Ltd.

Alderman H. F. Jensen stated that the Council had decided to place orders for 150 sets overseas but to buy 75 sets at higher prices from Australian manufacturers in order to support the local industry. The general manager reported that A. Reyrolle & Co., Ltd., quoted £108,990 for the 150 sets, while orders for 75 placed with the two Australian concerns would cost £81,523.

Alderman Jensen considered it unreasonable that the Council should have to bear the extra cost thus imposed on it.

Lower White River Plant

We are asked to rectify two slight misstatements in the description of the Lower White River Plant (Jamaica) in last week's issue. On p. 1063, right-hand column, the words "road out on to the cliff" should read "cut into the cliff" and on p. 1064, line forty-one, the word "alcove" should read "sleeve."

Trade Announcement

E. K. Cole, Ltd., have appointed Mr. W. A. Connor as their representative in the West Lancashire area, which includes Liverpool.

Catalogues and Lists

Trevor-Johnstone Co., Ltd., 14, Berkeley Street, Piccadilly, London, W.1.—Illustrated catalogue of the new R.V.A. airport and industrial recorder unit (A.C.E.C.-Belgium).

Lancashire Dynamo & Crypto, Ltd., Trafford Park, Manchester, 17.—"Versatility"—a leaflet showing pictorially a few of the applications of the company's products in industry (ML.74).

I.T.D., Ltd., 95-99, Ladbroke Grove, London, W.11.—Illustrated folder describing a recently introduced battery-charging trolley.

F. C. Blackwell & Co., Ltd., Great Crosby Works, Liverpool, 23.—Illustrated leaflet announcing further additions to the range of "Blaco" conduit fittings.

Dimplex, Ltd., Totton, Near Southampton, Hants.—Price list and illustrated folders dealing with oil-filled and water-filled radiators.

Igranic Electric Co., Ltd., Bedford.—"A Stitch in Time . . ."—a booklet dealing with some of the fundamental principals of electric motor control gear maintenance (Z.25).

Ekco-Ensign Electric, Ltd., 45, Essex Street, London, W.C.2.—Illustrated price broadsheets dealing with industrial and decorative fluorescent lighting fittings.

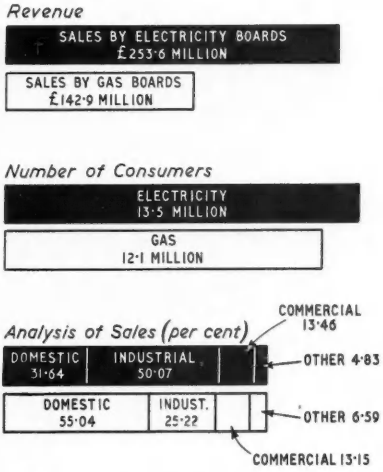
Simplex Electric Co., Ltd., Oldbury, Birmingham.—Two illustrated folders relating to miniature switch fuses and busbar chambers and switch fuses.

ELECTRICITY SUPPLY

Gas-Electric Comparisons

Higher Output in October

OUR leading article this week touches upon several points in the Gas Council's report for 1951–52 in an endeavour to compare the gas industry with its electricity supply counterpart. Comparisons can only be broad ones on account of the very different nature of the two services, although they are employed in somewhat similar directions; it is not easy, for instance, to compare therms with kilowatt-hours except on a purely thermal basis which would be misleading.



Broad comparison of gas and electricity industries

Accordingly in the accompanying diagram we show the magnitudes of the two industries as gauged by the revenues of the 14 Electricity Boards and 12 Gas Boards and the number of consumers. The analysis of sales by classes of consumer is also of interest.

Cables on Estates

The North Western Electricity Board has rejected Carlisle City Council's proposal that it should make a payment to the Council for the granting of wayleaves for laying underground cables on housing estates. In order that the supply of electricity to new estates shall not be delayed, the City Council has accepted the Board's terms.

Overhead Line Approved

Durham R.D.C. has accepted revised terms from the North Eastern Electricity Board for a proposed 20 kV overhead line at Coxhoe. The Council originally objected to the proposal because it crossed land intended for houses. The Board has proposed that the line should be diverted or placed underground on six months' notice if it was likely to interfere with building operations.

Power from Volcanic Steam

Volcanic steam which abounds in Japan is reported to have been successfully harnessed after repeated experiments conducted during the past six years by engineers of the Industrial Science and Technology Agency of the Ministry of International Trade and Industry.

The first power house utilizing underground steam will be established by the Kyushu Electric Power Co. The site, according to the construction plan, will be somewhere in the volcanic area of Mt. Kokonoe in Oita prefecture, Kyushu. The initial capacity will be 3,000 kW, but some 150,000 kW is said to be available.

Similar power plants are planned for other volcanic zones of Japan, there being about 40 localities where large-scale underground energy is available. The construction cost is said to be one-half to one-third of that of a hydraulic or thermal power plant.

Supply Schemes Deferred

The cost of laying on electricity to nine farms, four country houses and four cottages in the Hillend district of Fife would be about £12,000 and the annual revenue about £366. This was stated at a meeting of the S.E. Scotland Electricity Consultative Council in Edinburgh, which approved a proposal of the Board that the scheme should be deferred until the 1953–54 programme is under review.

The Council had before it a petition signed by 28 people asking for electricity for an area in Galashiels. Mr. Thomas Mullan, secretary of the Board, reported that the limitation on capital expenditure had been such that it had

not been possible to make electricity supplies available to houses wholly dependent on gas, except in the most urgent circumstances. More expenditure might be allotted to this type of work in the 1953-54 programme, and if possible supplies would be given to these houses during the course of the next year.

Route of 275 kV Line

Northumberland County Council has decided to take no further action regarding opposition to the erection of a 275 kV line from Stella (Blaydon) to Carlisle, a distance of about 50 miles. The National Farmers' Union proposed that the line should be erected in a more southerly direction so that it would interfere less with agricultural land. The Ministry of Fuel and Power has not approved the change and in confirming the British Electricity Authority's route said that the new line would be of considerable national importance and should be so constructed and sited as to ensure the maximum possible reliability of supply and reasonable ease of access for maintenance and repair. The Ministry stated that the more southerly route proposed by the Farmers' Union would not satisfy these conditions. The County Planning Committee commented that if the line were erected on the route proposed by the N.F.U. it would be brought closer to the Roman Wall and this would bring opposition from the Council for the Preservation of Rural England and the National Parks Commission.

Generation in October

Though less than in September, October's rate of expansion of electricity generated (5·1 per cent) was above the average for the year. Of the 5,558 million kWh generated, 5,403 million was from thermal stations and 142 million was hydro-electric, the latter figure being nearly 38 per cent more than in the corresponding month of last year. The total installed capacity in power stations of the British Electricity Authority, the North of Scotland Hydro-Electric Board and the Lochaber Power Co. at the end of October was 17,078 MW (see accompanying table). This represented an addition of 79 MW during the month. A second 375,000 lb/hr Foster Wheeler oil-fired boiler was brought into operation at Bankside (London, S.E.). Other new plant installed in B.E.A. power stations included the following:—Barking, 75 MW B.T.H. set. Uskmouth: 360,000 lb/hr Babcock & Wilcox boiler. Bromborough: 50 MW English Electric set. Croydon: 320,000 lb/hr Simon Carves boiler. Skelton Grange: 360,000 lb/hr International Combustion boiler. Deptford East: 250,000 lb/hr Foster Wheeler boiler. Northampton: 175,000 lb/hr Simon Carves boiler. West Ham: 30 MW English Electric set.

Wind Power in N. Wales

Mr. A. N. East, on behalf of the Ministry of Fuel and Power, held an inquiry last week into the proposal of the British Electricity Authority to erect a wind-driven generator on Mynydd-Annelwog, Caernarvonshire. There were objections by local inhabitants who contended that the plant would restrict their rights of grazing and fuel collection. Others objected on the ground of the noise which would be made by the 80ft double-bladed propeller. For the Authority it was said that the scheme would involve only 1½ acres and would not interfere with pasture and fuel rights. The decision of the inspector will be made known in due course.

Proposed Inquiry

It was announced at a meeting of the Glamorgan Planning Committee on 7th November that a public inquiry was to be held by the Ministry of Fuel and Power next January into the British Electricity Authority's proposal to build a new generating station at Lower Machen.

Supply for Yorkshire Villages

Mr. G. B. Drayson, M.P. for the Skipton Division, has been informed by the Yorkshire Electricity Board that it is expected to supply the two Craven villages of Coniston Cold and Hawkswick with electricity during the second half of the financial year 1953–54.

ELECTRICITY GENERATED AND PLANT INSTALLED

	Fuel consumed Thousand tons		kWh generated Millions			kWh sent out Millions	Installed capacity (m.c.r.) MW
	Coal	Oil	Steam	Water power	Total*		
British Electricity Authority ..	3,042	4·4	5,378	31	5,418	5,101	16,435
North of Scotland	16	1·1	25	111	140	138	643
Total for October, 1952	3,058	5·5	5,403	142	5,558	5,239	17,078
Corresponding total for Oct., 1951..	3,025	6·0	5,173	103	5,289	4,986	15,607
Increase or decrease, per cent ..	+1·1	−8·3	+4·4	+37·9	+5·1	+5·1	+9·4
Total for year to date (10 months)..	27,545	54·7	48,391	1,331	49,847	46,961	
Total for corresponding months of 1951	27,917	70·8	47,445	1,132	48,720	45,961	
Increase or decrease, per cent ..	−1·3	−22·7	+2·0	+17·6	+2·3	+2·2	

* The total includes 8·5 million kWh generated by oil engines and 4·8 million kWh by waste heat plants in October, 1952.

FINANCIAL SECTION

Company Notes and Stock Exchange Activities

Reports and Dividends

Tube Investments, Ltd.—The annual meeting will be held on 10th December. In his circulated statement, Mr. I. A. R. Stedeford (chairman), in referring to the electrical companies within the group, says that despite restrictions at home and bans abroad, they have finished the year making a not unsatisfactory contribution to the group's total profits. The prolonged period of depression by decree in the domestic electrical goods industry is forcing households and manufacturers alike to turn their attention elsewhere. Any change of heart in national fuel policy would receive the enthusiastic co-operation of manufacturers of electrical goods, but there is a limit to the years they can wait for it. Referring to the group's exports, he says that the value of direct exports for the past year was over £20 million, an increase over the previous year of £3,000,000. Part of this increase was due to rising prices, but there was also a greater volume of goods shipped. The Commonwealth continues to provide the best markets, but earnings of Canadian and United States dollars were also substantially increased.

Heenan & Froude, Ltd., report a group profit for the year to 30th August last of £394,003, as compared with £370,851 for 1950-51. Taxation requires £249,449, and with the balance of £58,582 brought in, the amount available is £203,097. After writing off trade investments, £44,310, and patents, £9,624, and placing £30,000 to general reserve, it is proposed to pay a final ordinary dividend of 10 per cent, making with the interim dividend of 5 per cent and the special jubilee bonus of 2½ per cent, a total of 17½ per cent for the year. This compares with a total of 15 per cent for the previous year and is on capital enlarged by a one-for-eleven scrip bonus. The balance carried forward is £59,266.

Joseph Lucas (Industries), Ltd., reports a consolidated surplus for the year ended 31st July last of £1,238,619, as compared with £1,609,032 for the preceding year. Taxation absorbed £4,322,799. After crediting other income of £169,797 and deducting profits of £606,692 retained by subsidiaries, the net profit of the parent company is £801,724 (against £928,297), which with the balance brought in, makes £1,172,603 available. It is proposed to pay a final ordinary dividend of 1s 6d per share, making 1s 10d per share for the year (or 9⅛ per cent), as compared with 1s 6d per share (7½ per cent) for the previous year.

S. Smith & Sons (England), Ltd., reports consolidated profits for the year ended 2nd August last of £1,248,229, as compared with £1,520,031 for 1950-51, and after providing £814,397 for taxation, there is a net profit of £433,832 (£601,663). The net profit of the parent company is £408,075 (£452,236). It is proposed to pay a final ordinary dividend of 10 per cent, maintaining the distribution for the year at 12½ per cent.

The British Electric Resistance Co., Ltd., reports a net profit for the year to 31st July last of £11,497, as compared with £10,483 for the previous year, after deducting £21,500 for taxation. General reserve receives £4,000, and it is proposed to pay a final dividend of 15 per cent (same), plus an additional dividend of 5 per cent (nil), making 25 per cent for the year (against 20 per cent). The balance carried forward is £9,432 (against £8,497 brought in).

The Revo Electric Co., Ltd., has declared an interim dividend of 10 per cent (against 5 per cent). The increase is to reduce the disparity between interim and final payments. Last year the total distribution was 27½ per cent.

Keith Blackman, Ltd., is to make a scrip bonus of one new 10s share for each share held.

Ward & Goldstone, Ltd., have declared an interim dividend of 15 per cent on capital increased by a 33⅓ per cent bonus. This compares with an interim dividend of 20 per cent on the old capital.

The Telephone Manufacturing Co., Ltd., is again paying an interim dividend of 2½ per cent.

Johnson & Phillips, Ltd., are paying an unchanged interim dividend of 7½ per cent.

New Companies

Neal Bros. (Otley), Ltd.—Registered 10th October. Capital £6,000. Electrical engineers and contractors, wireless, radio and television engineers, etc. Directors: L. Neal and N. Neal, Wharfdene, North Avenue, Otley. Secretary: P. E. Crowe, 5, East View Terrace, Otley.

Gordon Hughes Electrical Co., Ltd.—Registered 31st October. Capital £100. To acquire the business carried on by Gordon Hughes Electrical Co., Ltd. (in liquidation), and to carry on the business of electrical contractors and engineers, etc. Directors: J. P. Long and D. E. Raine. Regd. office: 861, Stratford Road, Hall Green, Birmingham.

George Hammond (Electrical), Ltd.—Registered 9th October. Capital £500. General, electrical, radio and television engineers and contractors, etc. Directors: G. A. Aldridge and Mrs. D. E. Hammond. Secretary: Mrs. D. E. Hammond. Regd. office: Aberdeen House, Arundel Road, Angmering, Sussex.

Flurotronic, Ltd.—Registered 9th October. Capital £100. Electrical engineers, manufacturers and dealers in electric lighting equipment of all kinds, etc. Permanent directors: B. A. Davis and W. J. Wright. Secretary: R. W. Gardner. Regd. office: 2, Beehive Parade, Eastern Avenue, Ilford.

Cannon Electric Distributors, Ltd.—Registered 16th October. Capital £1,000. Directors: Gwyneth M. Forrester and Wendy J. Forrester. Solicitors: Kenneth Brown, Baker, Baker, Essex House, Essex Street, W.C.2.

Norman Read, Ltd.—Registered 16th October. Capital £100. Electrical, mechanical, wireless, domestic, heating, central heating and air conditioning engineers, etc. Directors: N. Read and Mrs. Florence Read. Secretary: Florence Read. Regd. office: 136, The Avenue, Highams Park, E.4.

Hyndburn Electronics, Ltd.—Registered 20th October. Capital £1,000. Manufacturers and repairers of and dealers in industrial and domestic electronic equipment and components, etc. Directors: G. K. Talbot and A. Wallwork. Regd. office: 2/4, Croft Street, Accrington, Lancs.

Windings, Ltd.—Registered 4th November. Capital £500. Manufacturers of and wholesale and retail dealers in domestic, household and general electrical and other equipment and appliances, electrical windings, windings of transformers, chokes, etc. Directors: A. R. H. MacFarlane, A. E. Smith and W. T. Lunnun. Regd. office: 3, The Gardens, Rayners Lane, Pinner, Middx.

H. E. Hawley (1952), Ltd.—Registered 17th October. Capital £3,000. Electrical engineers and fitters, manufacturers of and dealers in motors, dynamos, etc. Solicitors: Ellis Ellis & Boulton, Burslem, Stoke-on-Trent.

G. L. Headley, Ltd.—Registered 7th November. Capital £10,000. To acquire the business of a wholesale electrical dealer now carried on by G. L. Headley at Bolton as G. L. Headley. Directors: G. L. Headley and W. R. Baker. Regd. office: 110, St. George's Road, Bolton.

Winding-up Petition

Altass Electric Co., Ltd.—A petition for the winding-up of this company has been presented to the High Court by the General Electric Co., Ltd., and will be heard in London on 24th November. Any person who intends to appear on the hearing of the petition must notify Cochrane & Cripwell, 119, Finsbury Pavement, London, E.C.2, solicitors to the petitioners, by 22nd November.

Liquidations

I. & W. Rockall, Ltd., electrical engineers, South Wharf Road, London, W.2.—At the statutory meeting of creditors held in London resolutions were passed confirming the voluntary liquidation of the company with Mr. N. W. Osborne, 11/12, Finsbury Pavement, London, E.C.2, as liquidator, together with a committee of inspection.

A. W. Fisher & Sons (Ipswich), Ltd., electrical engineers.—Winding up voluntarily. Liquidator, Mr. R. A. Paterson, 45, Princes Street, Ipswich, appointed 6th November. Particulars of claims to the liquidator by 30th November.

C.V.P. (Electrical), Ltd.—Meeting of creditors on 13th December at 211, Lower Addiscombe Road, Croydon, Surrey, to receive an account of the winding-up by the liquidator, Mr. H. C. Allen.

Bankruptcies

B. F. Robbings, 1422, Greenford Road, Greenford Green, Middx., lately carrying on business at 1388, Greenford Road, Greenford Green, under the style of "Electric House," and at 81b, Northolt Road, South Harrow, under the style of "Radio & Electric House," radio and electrical retailer.—Application for discharge to be heard on 12th December at the Court House, Half Acre, Brentford.

J. V. Depledge, 68, Avenue Vivian, Scunthorpe, lately carrying on business at 108, Frodingham Road, Scunthorpe, Lincs, electrical contractor.—Trustee, Mr. L. F. McCulloch, 26, South Saint Mary's Gate, Great Grimsby, released 17th October, 1952.

H. M. Pollen, lately carrying on business as a radio and electrical engineer under the style of "Thames Side Electrical Services," at 51, Thames Street, Staines, Middx.—Trustee, Mr. N. W. Osborne, 11-12, Finsbury Square, London, E.C.2, appointed 4th November.

R. H. Myers, trading as T. Myers & Son, at 169, Aston Road, Birmingham, 6, gas and electrical engineer.—First and final dividend of 8s 10¾d in the £, payable on and after 22nd November at 126, Colmore Row, Birmingham.

STOCKS and SHARES

INDUSTRIAL markets of the Stock Exchange have drawn encouragement from recent news, of which the relaxation of Australia's import restrictions, in advance of the Commonwealth conference, was one of the most satisfactory items. Annual company results, such as those produced lately by Tube Investments, Joseph Lucas and B.S.A., also share the credit for the noticeable hardening of investment confidence. In the gilt-edged market, the initial discount on the new 4 per cent British Transport Stock has been replaced by a fractional premium. Among electrical equipment shares, Revo Electrics were marked up to 42s 6d, after the doubling of the interim dividend, although the company advises shareholders that it is being done only to reduce the disparity between the interim and final dividend rates.

Lucas Dividend

Market expectations were well satisfied by the increase in the Joseph Lucas (Industries) dividend from a total of 1s 6d to 1s 10d per share, for the year to July last. At 34s 6d ex dividend, the £1 shares have recovered the deduction of the final distribution from the price. There has been a reduction in the group net surplus (according to the preliminary figures) from £1·6 to £1·2 million, but this is more than accounted for by increased tax provisions, which have risen by over half a million to a total of £4·3 million. Pending the full accounts, the assumption is that operating profits have been satisfactorily maintained, while the decision to raise the dividend (which still appears to be well within earnings) is taken as an expression of confidence in current conditions. The shares now show a yield of a fraction under 5½ per cent, which brings them into line with others in the " blue chip " class of home industrials.

Plastics

In declaring an interim dividend of 3 per cent a fortnight ago, Bakelite, Ltd., took the opportunity to give shareholders an interim trading report. This says that although there has been, since May, a reduction of about 10 per cent in sales, both at home and overseas, the total turnover for the first ten months of the year is comparable with that for the corresponding period of 1951. The company's 10s shares were brought to the Stock Exchange in April last, and are quoted now at 17s 6d. Little indication was given, in the advertised particulars, about dividend prospects for the year ending next month. For 1951, the company paid a conservative 25 per cent dividend from substantially increased profits, and subsequently doubled the ordinary capital—now £1,500,000—by a capital bonus. Large interests are held by Pinchin & Johnson and by the Union Carbide Corporation of America.

S. Smith & Sons Results

S. Smith & Sons (England) are maintaining their dividend at the same total of 12½ per cent as before. A decline of a few pence in the price of the 4s ordinary shares, to 8s 3d, reflected apparently the lower group profits shown in the preliminary statement, the net surplus after tax (and excluding credits from the previous year) being £168,000 down at £434,000. Preference and ordinary dividends together involve the payment of less than £150,000 net, so that the distributions remain covered with a substantial margin. At last year's meeting, the chairman referred to the dependence of prospects upon those of the motor-car manufacturers and aircraft constructors.

African Cables

Events in South Africa have recently put virtually all local investments under a cloud. But for this, there might have been a more active market reaction to the annual results published towards the end of last month by Aberdare Cables, Africa, Ltd. Formed six years ago under Sir George Usher's direction, this company is now well into its stride. Having nearly doubled the net profit in 1950–51, the company reports a further expansion of some 65 per cent in the latest figure of £183,000 after tax. The dividend is again raised, from 10 to 15 per cent on this occasion, and reserves are being augmented by well over £100,000. The 5s shares stand at 12s 6d, yielding 6 per cent on the latest rate of dividend.

Switchgear New Shares

The new 5s ordinary shares offered to existing shareholders of Switchgear & Cowans, in the proportion of one new for every six shares held, are changing hands at a premium of about 4s 3d on the issue price of 10s. As already mentioned, the directors intend in the ordinary course of events to maintain the distribution for 1952 at last year's rate of 22½ per cent. On that basis, the new shares, which are currently available free of stamp, offer a prospective yield of over 7¾ per cent. Arrangements are being made for the provision of further funds through the placing of £200,000 debenture stock. Proceeds of the two issues will produce about £244,000 net which, it is stated, will provide for the repayment of the overdraft, and for the establishment of the company's finances on a sounder and more permanent basis.

ELECTRICAL INVESTMENTS

Past Week's Price Changes

Company	Dividend Previous	Dividend Last	Middle Price 17th Nov. 1952	Week's Rise or Fall	Est. Yield £ s d
Gilt-edged and Overseas Stocks					
Brit. Elec. 1968/73	3	3	84½	—	3 11 0
Brit. Elec. 1974/77	3	3	83	—	3 12 3
Brit. Elec. 1976/79	3½	3½	89½	—	3 18 3
Brit. Elec. 1974/79	—	4½	100	—	4 5 0
Calcutta Elec. ..	6†	6†	20/6	—	5 17 1†
East African Power	7	7	23/-	—	6 1 9
Nigerian Elec. ..	10	10	21/3	—	—
Palestine Elec. "A"	5†	Nil	11/6	−1/-	—
Perak Hydro-Elec.	Nil	Nil	15/-	+6d	Nil
Equipment and Manufacturing					
AberdareCables(5/-)	20	20	14/-	—	7 2 10
Aerialite (1/-) ..	83½	88½	8/-	—	11 0 10
Allen, W. H. ..	15	15	41/9	—	—
Aron Elec. Ord. ..	15	15	33/9	—	8 17 9
Assoc. Elec. Ord...	20	20	72/6	—	5 10 6
Automatic Tel. & El.	15	15	57/-	+9d	5 5 3
Babcock & Wilcox	18	18	67/-	−1/9	5 7 6
Baldwin, H. J. (2/-)	25	20	3/6	−6d	11 8 9
Bakelite (10/-) ..	—	—	17/6xd	—	—
British Aluminium	10	12	43/3	+3d	5 11 0
B.I. Callender's ..	7½	9	33/-	—	5 9 1
British Thermostat (5/-)	30	30	27/-	—	5 11 1
British Vac. Cleaner (5/-)	25	25	13/-	—	9 12 4
Brook Motors (10/-)	20	20	28/9	—	6 19 2
Brush Ord. (5/-) ..	10	10	5/-xd	—	10 0 0
A. F. Bulgin (1/-)..	27½	30	2/6	—	12 0 0
Burgo (5/-) ..	38½	35	19/6	−6d	8 19 6
Chloride El. Storage	15	15	61/3	—	4 18 0
Cole, E. K. (5/-) ..	25	25•	15/6	—	8 1 4
Cossor, A. C. (5/-)	Nil	10	8/6	—	5 17 8
Crabtree (10/-) ..	17½	17½	32/6xd	—	5 7 8
Crompton Parkinson Ord. (5/-) ..	11½	11½	9/-	—	6 5 0
De La Rue (5/-) ..	50	35•	8/6	+1/-	—
Decca (1/-) ..	112½	112½	17/3	+3d	6 10 9
Dewhurst (2/-) ..	35	22½•	5/-	—	—
Dictograph Tel.(2/-)	20	20	5/-xd	—	8 0 0
E.M.I. (10/-) ..	12	12	14/9	+6d	8 2 9
Electrical Components (5/-) ..	20	20	10/-	—	10 0 0
Elec. Construction	15	15	50/-	—	6 0 0
Enfield Cable Ord.	7½	7½	22/-	—	6 16 4
English Electric ..	15	15	55/6	—	5 8 1
Ericsson Tel. (5/-)	22†	22•†	39/6	−6d	2 15 8†
Ever Ready (5/-)..	35	35	26/-	—	6 14 8
Falk Stadelmann	15	15	38/9xd	—	7 14 8
G.E.C. Ord. ..	22½	22½	42/6	—	5 6 0•
General Cables (5/-)	30	30	14/6	—	10 6 10
Greenwood & Batley	15	15	38/-	+1/-	7 18 0
Hackbridge Cable (5/-)	20	20	11/3	—	8 17 10
Hackbridge Hewittic (5/-)	18	20	16/3	—	6 3 0
Hall Tel. Acc. (10/-)	10	10	10/6	—	9 10 6
Heatrae (2/-) ..	12½	12½	4/-	—	6 5 0
Henleys (5/-) ..	20	20	18/3	+6d	5 9 6
Holophane (5/-) ..	15	20•	11/3	—	8 17 10
Hoover (5/-) ..	37½	35•	22/-	−6d	7 19 0

Company	Dividend Previous	Dividend Last	Middle Price 17th Nov. 1952	Week's Rise or Fall	Est. Yield £ s d
Equipment and Manufacturing (continued)					
Intl. Combustion (5/-)	20	25	22/6	—	5 11 0
Johnson & Phillips	15	15	52/6	—	5 14 3
Lancashire Dynamo	22½	12½•	42/6	—	5 17 8
Laurence, Scott (5/-)	12½	15	12/9	—	5 17 8
London Elec. Wire	10	12½	49/6	+9d	5 1 0
J. Lucas	7½	9⅛	34/6xd	—	5 6 3
Marryat & S. (2/-)	22½	22½	5/-	—	9 0 0
Mather & Platt ..	12½	12½	40/9	−⅛	6 2 9
Metal Industries ..	10	15	38⅜	+3d	—
Mid. Elec. Mfg. ..	15	15	53/9	—	5 11 6
Murex	12½	15	53/-	—	5 13 3
Newman Ind. (2/-)	6	10	2/3	—	8 17 10
Oldham & Son (1/-)	30	35	2/6	—	—
Parnall (Yate) (5/-)	6	6	4/3	—	7 1 3
Parsons, C. A. ..	15	10•	53/9	—	—
Plessey (5/-) ..	20	22½	20/9	+1/-	5 8 5
Pye Deferred (5/-)	18	18	15/3	—	5 18 0
Revo (10/-) ..	27½	27½	42/6	+⅛	6 9 6
Reyrolle	15	10•	47/6	—	—
Scot. Cable (4/-) ..	30	32	10/9	—	—
Siemens Ord. ..	10	10	34/-	—	5 17 8
Strand Elec. (5/-)..	17½	17½	8/9	—	10 0 0
Sturtevant (5/-) ..	16½†	17¼•†	22/6	—	—
Switchgear & Cowans (5/-)	22½	22½	13/-	—	—
Taylor T. (5/-) ..	20	20	20/-	—	5 0 0
T.C.C. (10/-) ..	20	20•	37/6	—	—
T.C. & M... ..	10	10	25/6	−6d	—
Telephone Mfg. (5/-)	10	10	8/-	—	—
Thorn Elec. (5/-) ..	10	12½	8/-	—	7 10 3
Tube Investments	25	15•	55/9xd	—	5 7 6
Vactric (5/-) ..	Nil	Nil	5/-	+⅛	Nil
Veritys (5/-) ..	Nil	7½	4/9	−3d	7 18 0
Walsall Conduits (4/-)	70	70	45/-	—	—
Ward & Goldstone (5/-)	45	45•	30/9	−1/9	—
Watford (2/-) ..	25	25	6/3	—	8 0 0
Westinghouse Brake	14	14	48/9	—	5 14 10
West, Allen (5/-)..	12½	15	10/3	—	7 6 4
Trusts, Transport and Communications					
Anglo-Am. Tel.: A Ord.	—	6	79½xd	−4	7 11 0
Ord.	—	3½	55xd	—	6 16 3
Anglo-Portuguese	8	8	20/6xd	—	7 16 1
Brit. Elec. Traction: Def. Ord. ..	22½	25	425	−10	5 17 8
Cable & Wireless: Ord.	6	8	122½	−1½	6 10 8
4% Loan ..	4	4	98½	—	4 1 3
Calcutta Trams ..	6†	6†	20/6	−6d	5 17 1†
Cape Elec. Trams	5	5½	10/-	—	11 0 0
Marconi Marine ..	10	10	30/6	−6d	6 11 3
Oriental Tel. Ord.	16	16	57/6	—	—
Telephone Props...	8	8	35/-	—	4 11 5
Tele. Rentals (5/-)	10	10	9/-	—	5 11 1

• After capital bonus.
† Dividends are paid free of Income Tax.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Translucent Lighting Unit

AN entirely translucent all-glass lighting fitting, embodying a glass canopy, has been developed by HOLOPHANE, LTD., Elverton Street, London, S.W.1, for use in situations where good appearance combined with high photometric efficiency are essential.

A feature of this "Lumilux" fitting is the combined glass canopy and reflector which is one moulding and not only eliminates the normal separate canopy but gives added strength to the unit. The diffusing cover glass is clipped to the reflector and carries a diffusing pattern of flutes and cross prisms. The reflector may be white or "Correctalite" while the cover glass is white only.

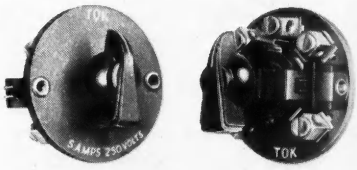
The principle of supporting the glass is interesting in that a rectangular die cast porcelain e.s. lampholder enters a rectangular aperture in the top of the glass and is turned to register across the aperture, it then being locked in position by a top cover plate. Two soft pads attached to the casting prevent glass-to-metal contact on the load bearing surface. The units are available for use with 150 W or 200 W filament lamps and are made for chain or tube suspension.

Push-button Switch

The latest addition to the products of ARROW ELECTRIC SWITCHES, LTD., Hanger Lane, London, W.5, is a pull-on push-off switch primarily intended for fitting to panels and dashboards. These switches are available with moulded or metal operating knobs and have a quick make and break action rated at 3 A a.c. or d.c.

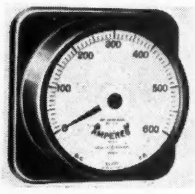
Rotary Switches

A range of 5 A slow break four-position rotary switches suitable for flush or box mounting is now available from TOK ELECTRICAL INDUSTRIAL MECHANISMS, LTD., 2, Wadsworth Road, Perivale, Middlesex. These K.10 switches are available with over fifty different switching sequences, including four-circuit selective and double-pole change over with off and, although they are primarily designed for use in a.c. circuits up to 250 V, they can be used to a limited extent on d.c. circuits at reduced current rating.

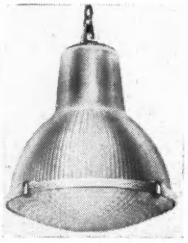


Tok K.10 rotary switches for flush fixing (*left*) **or box mounting** (*right*)

Left: **Arrow 3 A dash-board switch**



Below Left: **Crompton Parkinson circular scale ammeter in a projecting type moulded case**



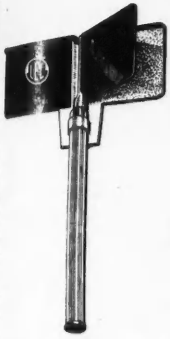
Below Right: **Holophane "Lumilux" translucent lighting fitting**

Circular Scale Instruments

Switchboard moving-iron a.c. (C.P.K.A. pattern) and d.c. (C.P.A. pattern) ammeters and voltmeters with 4in and 6in diameter dials and 240 deg scales are now available from CROMPTON PARKINSON, LTD., Crompton House, Aldwych, London, W.C.2. The instruments incorporate a movement similar to that of the 3·5in dial ammeters and voltmeters introduced earlier this year. They have attractively designed moulded cases and are intended for either flush or projection mounting.

Transformer Excess Load Indicator

There has long been a need for a simple and inexpensive device to give a clearly visible indication of overload on transformers, particularly pole mounted rural transformers. Such a device is now available from LINE EQUIPMENT,



Left: **Line Equipment transformer excess load indicator.** *Right:* **G.E.C. a.c. load analyser**

LTD., 32, Queen Victoria Street, London, E.C.4. It fits into the thermometer pocket of the transformer tank and carries at its outer end a screen 4in by 1·5in presenting a black face visible from the ground. A flag covering half the surface is hinged centrally and when the oil in the transformer reaches its maximum permissible temperature, the flag turns through 180 deg, exposing a red surface 4in by 1·5in.

The device depends for its operation upon a eutectic alloy and is normally set to operate at 62·5 deg C or, for tropical countries, 83 deg C. After operation, the indicator can be re-set by heating the lower 2in of the body to a temperature in excess of the operating temperature, rotating the flag back to its normal position, then allowing the indicator to cool in a vertical position. It costs 17s 10d.

Fluorescent Magnetic Ink

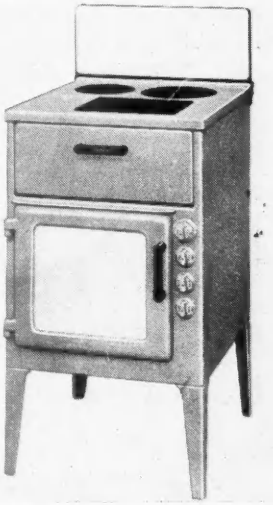
A fluorescent magnetic flaw detection ink for the non-destructive testing of ferrous metal parts is now being made under the trade name "Lumor" by the MANCHESTER OIL REFINERY, LTD., Twining Road, Trafford Park, Manchester, 17. This liquid is particularly valuable because of the marked contrast of flaw detection under an ultra-violet light. It is being produced in two grades, "K" and "S." The former has a petroleum base while the latter has a non-petroleum base and is odourless. The ink could be safely used on rubber-bonded steel or cast iron without causing any swelling of the rubber.

Load Analyser

A self-contained a.c. test set for measuring current, voltage power and power factor in single-phase and polyphase circuits has just been brought out by the GENERAL ELECTRIC CO., LTD., Magnet House, Kingsway, London, W.C.2. It comprises four 3·5in diameter instruments with 7·5in scales. These are an ammeter, a voltmeter, a double element induction wattmeter and a three-phase unbalanced load power factor meter. The instrument has ranges of 5, 25 and 125 A, 150, 300 and 600 V and from 1 to 100 kW. The accuracy in voltage and current is 1 per cent of full scale and in power 2 per cent of full scale. The power factor meter has an accuracy of 2 deg between unity and 0·5. Built-in switches change the voltage range and insert the voltmeter and ammeter in each phase.

Cooker with Larger Oven

As a development of its 190J "Cleanline" cooker the JACKSON ELECTRIC STOVE CO., LTD., 143, Sloane Street, London, S.W.1, has introduced model 191J, which has a much larger oven capacity and has 8in and 6½in boiling plates besides a grill boiler. It is fitted with thermostatic oven control and is offered as a leg model, finished in grey splash or mottled green and cream vitreous enamel, from £27 6s.



Jackson 191J cooker

Like the 190J model, now listed at £24, it is eminently suitable for housing estates and other contracts.

The 192J and 194J cookers are now offered as drawer models only with a standard finish of two-tone ivory at the following prices:—£31 7s 6d and £36 9s 6d respectively with cold drawer; £33 2s and £38 4s respectively with heated drawer.

NEXT WEEK'S EVENTS

Monday, 24th November

BIRMINGHAM.—James Watt Memorial Institute, Great Charles Street, 6 p.m. I.E.E. South Midland Radio Group. "Radio Astronomy," by K. D. Machin.

BOURNEMOUTH.—Grand Hotel, Firvale Road, 8.15 p.m. A.S.E.E. Bournemouth Branch. "Formation of Ducts in Concrete Non-Expendable Material."

BRISTOL.—Electricity House, Colston Avenue, 6 p.m. I.E.E. Western Utilization Group. "Inherent Current Voltage and Speed Control in Dynamo-Electric Machinery," by J. C. Macfarlane, Dr. J. W. Macfarlane and W. I. Macfarlane.

KENDAL.—Castle Street School, 7 p.m. I.E.E. North Lancashire Sub-Centre. District meeting. "A Logical Approach to the Problems of Electric Space-Warming," by D. H. Parry.

LEEDS.—Lighting Service Bureau, 24, Aire Street, 6.15 p.m. I.E.S. Leeds Centre. "Brightness Engineering," by W. Robinson.

LEICESTER.—Demonstration Theatre, E.M.E.B., Charles Street, 6.30 p.m. I.E.S. Leicester Centre. "Black Light, its Effect and Applications," by H. L. Privett.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. "Recent Progress in Radar Duplexers, with special Reference to Gas-Discharge Tubes," by P. O. Hawkins.

MANCHESTER.—Free Trade Hall, 7.30 p.m. I.E.E. North-Western Centre. Faraday Lecture. "Light from the Dark Ages or the Evolution of Electricity," by A. R. Cooper.

NEWCASTLE-ON-TYNE.—Neville Hall, Westgate Road, 6.15 p.m. I.E.E. North-Eastern Centre. "Uses of Earthed Signal Conductors on Transmission Circuits," by W. Casson.

Monday, 24th November, to Friday, 28th November

LONDON.—Olympia. Brewers' Exhibition.

Tuesday, 25th November

CARDIFF.—Demonstration Theatre, South Wales Electricity Board, 5.45 p.m. I.E.S. Cardiff Centre. "Lighting of Modern Ocean Liners," by T. Catten.

EDINBURGH.—At the Engineering Centre, 351, Sauchiehall Street, 6.30 p.m. Institution of Heating and Ventilating Engineers, Scottish Branch. "Hospital Engineering Services," by W. Russell.

LEEDS.—1, Whitehall Road, 6.30 p.m. I.E.E. North Midland Utilization Group. "A Logical Approach to the Problems of Electric Space-Warming," by D. H. Parry.

LONDON.—Savoy Hotel. Radio Industry Council. Annual dinner with Duke of Edinburgh as principal guest.

Savoy Place, W.C.2, 7 p.m. I.E.E. London Students' Section. "The Measurement of Very Small Direct Currents," by M. W. Jervis.

At the Institution of Electrical Engineers, 2, Savoy Place, W.C.2, 2.30 p.m. Electrical Association for Women. Conference on the fuel situation.

Manson House, Portland Place, W.1, 7 p.m. Society of Instrument Technology. Symposium on "Control Valves."

MANCHESTER.—Engineers' Club, Albert Square, 6.15 p.m. I.E.E. North-Western Measurements Group. "Voltage Transformers and Current Transformers associated with Switchgear," by W. Gray and A. Wright.

YORK.—The Creamery Restaurant, Pavement, 7.30 p.m. A.S.E.E. York Branch. "Production and Application of Toughened Glass," by P. M. Davidson.

Wednesday, 26th November

BIRMINGHAM.—Imperial Hotel, 6.45 p.m. Engineers' Guild, West Midlands Branch. "The Relation Between a Consulting Engineer and his Client," by Major A. H. S. Waters.

GLOUCESTER.—City Library, 7 p.m. I.E.E. Bristol Students' Section. "Metal Rectifiers and some of their Applications," by K. L. Streeter.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Supply and Measurements Sections. "The Electrolytic Analogue in the Design of High-Voltage Power Transformers," by D. McDonald. "The Accurate Mapping of Electric Fields with an Electrolytic Tank," by Dr. K. F. Sander and J. G. Yates.

Lighting Service Bureau, 2, Savoy Hill, W.C.2, 6 p.m. Illuminating Engineering Society. Informal meeting. Discussion on Home Lighting.

Waterloo Bridge House, S.E.1, 5 p.m. Institution of Post Office Electrical Engineers, London Centre. Informal meeting. "Mechanical Aids," by G. A. Probert.

LUTON.—George Hotel, 8 p.m. A.S.E.E. Luton Branch. "A Camera and the Engineer," by G. E. Whalley.

MALVERN.—Winter Gardens Restaurant, 7.15 p.m. I.E.E. South Midland Centre. District meeting. "The Measurement of Electrical Activity in the Human Body," by J. C. Shaw.

MANCHESTER.—Engineers' Club, Albert Square, 6.30 p.m. I.E.E. North-Western Radio Group. "Radio Telemetering," by E. D. Whitehead and J. Walsh.

MIDDLESBROUGH.—Cleveland Scientific and Technical Institute, Corporation Road, 6.30 p.m. I.E.E. Tees-side Sub-Centre Students' Section. "Electric Generation Costs," by D. G. Berry.

SWANSEA.—Minor Hall Y.M.C.A., 6 p.m. I.E.S. Swansea Group. "Lighting of Modern Ocean Liners," by T. Catten. (Joint meeting with the E.A.W.).

Wednesday, 26th November and Thursday, 27th November

LONDON.—4, Grosvenor Gardens, S.W.1. Iron and Steel Institute. Autumn Meeting.

Thursday, 27th November

BIRMINGHAM.—Regent House, St. Philip's Place, Colmore Row, 6 p.m. I.E.S. Birmingham Centre. "Lighting of Docks and Railway Marshalling Yards," by W. T. F. Souter.

New Inns Hotel, Handsworth. Junior Institution of Engineers, Midland Section. Annual dinner-dance.

SHEFFIELD.—Grand Hotel, 7.30 p.m. Incorporated Plant Engineers, South Yorkshire Branch. "Radiology and its uses in Steelworks," by F. Hinsley.

Friday, 28th November

BIRMINGHAM.—Incorporated Plant Engineers, Birmingham Branch. Ladies' Evening. "Domestic Use of Fuel," by J. Nixon.

LONDON.—Connaught Rooms, W.C.2, 5.30 for 6 p.m. E.P.E.A. South Eastern Division. Annual dinner.

Connaught Rooms, W.C.2. Old N'Ions Association. Silver jubilee annual dinner and reunion.

Townsend House, Greycoat Place, 7 p.m. Junior Institution of Engineers. Annual general meeting.

MANCHESTER.—Engineers' Club, Albert Square, 6.45 p.m. Manchester Association of Engineers. "Economic Review," by A. Elliott.

PETERBOROUGH.—Incorporated Plant Engineers, Peterborough Branch. Annual dinner.

SWANSEA.—Langland Bay Hotel, 7 p.m. I.E.E. Wales (Swansea) Sub-Centre. Annual dinner and dance.

I.E.S. Swansea Group. Annual supper-dance.

Saturday, 29th November

BLACKPOOL.—Cliffs Hotel, 6.30 p.m. I.E.E. North Lancashire Sub-Centre. Dinner-dance.

LONDON.—I.E.E. London Students' Section, 2 p.m. Visit to Radiology Department, St. Bartholomew's Hospital, E.C.1.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s 8d each including postage) will be obtainable after 31st December from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1947

21542. Mullard Radio Valve Co., Ltd., and Strivens, M. A.—Electrical condensers. 23rd June, 1948. (685031.)

28474. Standard Telephones & Cables, Ltd., Weir, D. A., and Gordon, K. T.—Means for recording and reproducing electrical signals, more particularly for teleprinter systems. 22nd October, 1948. (685032.)

33313. British Thomson-Houston Co., Ltd., and Gabor, D.—Microscopy. 19th January, 1949. (685286.)

1948

8165. Marconi's Wireless Telegraph Co., Ltd., Hatch, J. F., and Brittain, J. W.—Radio aerial installations. 26th October, 1948. (685287.)

8867. Hilger & Watts, Ltd., and Schwarz, E.—Photocells. 16th March, 1949. Cognate application 14715, 31st May, 1948. (685288.)

13943. Kompfner, R.—Electron-discharge devices. 24th May, 1948. (685033.)

1949

3355. Metropolitan-Vickers Electrical Co., Ltd.—Turnsensitive devices. 27th February, 1950. (685113.)

10351. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Circuits for embodiment in automatic telephone exchange and like systems. 19th April, 1949. (685205.) 10742. Busying circuits for automatic signalling systems. 22nd April, 1949. (685206.)

11482. Bendix Aviation Corporation.—Electronic amplifier. 29th April, 1949. (684955.)

14619. General Electric Co., Ltd.—Apparatus of the kind in which a record medium in the form of a tape, strip or wire is transferred between storage reels. 31st May, 1950. (685116.)

17231. Normalair, Ltd., and Swaffield, P. J.—Electrically operated indicators. 27th June, 1950. (685053.)

18455. Ballard, W. F.—Control of electric arcs used in welding or metal spraying processes. 13th July, 1950. Cognate applications 22001, 24th August, 1949, and 31411, 7th December, 1949. (685296.)

19515. Hoover (Electric Motors), Ltd., and Wickham, A. H.—Winding machines. 5th July, 1950. (685121.)

20699. Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—Line-finder circuit arrangements. 9th August, 1949. (685297.)

20722. Radio Corporation of America.—Frequency-controlled oscillation generator systems. 9th August, 1949. Addition to 662505. (685298.)

21305. Williams, R. G.—Colour lighting and control apparatus therefor. 16th August, 1950. Cognate application 2875. 3rd February, 1950. (685209.)

24763. Pye, Ltd., and Court, P. R. J.—Television scanning circuits. 13th September, 1950. (685126.)

25624. Soc. Rateau, and Anxionnaz, R.—Power plant comprising the combination of gas and steam turbines with supercharged furnace steam generator. 5th October, 1949. (684959.)

30163. General Electric Co., Ltd., Harling, D. W., and Head, N. E.—Multi-channel pulse communication systems. 24th November, 1950. (685216.)

30964. Loader, L. W.—Boxes for switches and plugs of electrical installations. 29th November, 1950. Cognate application 26645, 1st November, 1950. (685129.)

31094/5. Ferranti, Ltd., Easton, H., and Seddon, J.—Relays of the induction type. 27th February, 1951. (685304/5.)

33023. National Research Development Corporation.—Electronic digital computing devices. 14th December, 1950. (685218.)

1950

735. Philips' Electrical Industries, Ltd.—Automatic telephone and like exchange systems. 11th January, 1950. (685309.)

2744. Philips' Electrical Industries, Ltd.—Magnetic cores. 2nd February, 1950. (685065.)

2856. California Research Corporation.—Electrical bridge network. 3rd February, 1950. (685220.)

3510. Marconi's Wireless Telegraph Co., Ltd.—Thermionic valve circuit arrangements. 10th October, 1950. (684963.)

4018. General Electric Co., Ltd., and Richardson, W. P.—A.c. motor systems and motors therefor. 16th February, 1951. (685140.)

4080. Rapid Magnetic Machines, Ltd., and Lane, W. B.—Magnetic separator. 19th February, 1951. (685142.)

4148. Massons, E. C.—Electromagnetically operated pump for raising liquids. 17th February, 1950. (685143.)

5203. Reyrolle & Co., Ltd., A., and Leyburn, H.—Electric generators for short-circuit testing. 19th February, 1951. (684965.)

5388. Ashley Accessories, Ltd.—Bayonet type two-part electric couplings. 16th February, 1951. (685221.)

6105. Rink, H. L., and Spence, R. F.—Electric lighter. 27th February. 1951. (685313.)

7454. British Thomson-Houston Co., Ltd., and Webb, A. J.—Apparatus for use in the manufacture of electric discharge lamps. 28th February, 1951. (685222.)

7800. Clang, Ltd.—Portable electric lamps. 19th March, 1951. (685148.)

7960. Foster Transformers & Switchgear, Ltd., and Jennings, R. E.—Electric arc welding appliances. 21st March, 1951. (685316.)

9321. Ericsson Telephones, Ltd., and Melton, H. J.—Selecting switches. 13th April, 1951. (685223.)

9412. Metropolitan-Vickers Electrical Co., Ltd.—Crystal amplifying devices. 11th April, 1951. (685070.)

10081. Metropolitan-Vickers Electrical Co., Ltd.—Saturable core reactance devices. 21st March, 1951. (685320.)

11437. Dowty Equipment, Ltd., and Snell, M. S.—Plug-and-socket electrical connectors. 8th May, 1951. (685150.)

12837. Electric & Musical Industries, Ltd.—Method and apparatus for reproducing magnetically recorded sound. 11th May, 1951. (685227.)

13206. Marconi's Wireless Telegraph Co., Ltd.—Radio aerial systems for use on ultra-short wavelengths. 2nd March, 1951. (685073.)

13404. Santon, Ltd.—Liquid filled electrically heated radiators. 29th May, 1951. (685322.)

13500. British Thomson-Houston Co., Ltd.—Electric cables. 30th May, 1950. (685074.)

13540. Santon, Ltd.—Micro-gap electrical switches. 30th May, 1951. (685323.)

15243. Measurement, Ltd.—Electricity meters. 19th April, 1951. (685324.)

15735. Western Electric Co., Inc.—Methods of making thin film resistors. 23rd June, 1950. (685229.)

18584. Associated Electrical Industries, Ltd.—Electric circuit arrangements for performing mathematical operations. 29th May, 1951. (684989.)

19125. Sunbeam Corporation.—Thermal responsive control device for electric cooking or heating appliances. 31st July, 1950. (684990.)

19346. Siemens-Schuckertwerke Akt. Ges.—Electric insulators. 2nd August, 1950. (684991.)

19820. General Electric Co., Ltd., and Turrall, J. C.—Electric motor control systems. 9th August, 1951. (685162.)

19893. Alkaline Batteries, Ltd.—Anchoring device for insulated flexible electric cable. 18th July, 1951. (685081.)

20663. Reyrolle & Co., Ltd., A., and Bayles, J. W.—Electric d.c. generators. 21st August, 1951. (685235.)

21359. Dowty Equipment, Ltd.—Magnetic snap-action electrical switches. 29th August, 1951. (685332.)

23816. Siemens & Halske Akt.-Ges.—Telegraph repeater systems. 28th September, 1950. (685240.)

24671. Share, K. E. B.—Electrical measuring instruments. 10th October, 1951. (685002.)

24819. McGeoch & Co., Ltd., W., and Watt, H. S.—Cable gland for electric cable. 10th October, 1951. (685003.)

24858. General Electric Co., Ltd., and Rudge, T. R.—Electrical indicating instruments. 18th October, 1951. (685244.)

24934. British Insulated Callender's Cables, Ltd.—Electric cables. 11th October, 1951. (685005.)

25024. Cinema-Television, Ltd.—Apparatus for the measurement of complex impedance. 12th October, 1951. (685006.)

25316. Telegraph Construction & Maintenance Co., Ltd.—Electrical communication cables. 17th October, 1951. (685246.)

25319. Minister of Supply.—Formation of metallic structures by electrodeposition. 17th October, 1951. (685247.)

26494. General Electric Co., Ltd., and Scowcroft, J.—Telephone systems. 20th August, 1951. (685337.) 26495. Automatic telephone systems. 11th October, 1951. (685169.)

28306. Bureau Technique Gautrat.—Gas-tight storage batteries and methods of manufacturing them. 20th November, 1950. (685341.)

29040. Scintex.—Thermal interrupters for electric flash-light signals. 28th November, 1950. (685255.)

31021. Western Electric Co., Inc.—Resistor materials and high-temperature coefficient resistors made therefrom. 20th December, 1950. (685259.)

31210. Babcock & Wilcox, Ltd.—Apparatus for the combustion of particled solid fuel. 22nd December, 1950. (685176.)

1951

1733. Philips Electrical Industries, Ltd.—Switching systems, more particularly back-to-back Gratz rectifying systems. 23rd January, 1951. (685265.)

2935. Soc. Anon. de Telecommunications.—Signalling current transmission arrangements for two-wire repeater circuits. 6th February, 1951. (685350.)

4298. Westinghouse Electrical International Co.—Electronic control circuits. 22nd February, 1951. (685272.)

4331. British Thomson-Houston Co., Ltd.—Starting circuits for fluorescent lamps. 22nd February, 1951. (685273.)

4482. Radio Corporation of America.—Transmission of signals by electric waves. 23rd February, 1951. (685352.)

5018. Telefonaktiebolaget L. M. Ericsson.—Method for fastening contact springs on a support of insulating material. 1st March, 1951. (685276.)

5254. Research Corporation.—Electro-hydraulic servo mechanism. 5th March, 1951. (685353.)

6513. Philips Electrical Industries, Ltd.—Mountings for inductance coils and the like. 19th March, 1951. (685354.)

7533. Philips Electrical Industries, Ltd.—Electrical rectifying systems. 2nd April, 1951. (685098.)

8475. Oldham & Son, Ltd.—Battery separators. 11th April, 1951. (685099.)

10251. Licentia Patent-Verwaltungsges.—Tirrill regulator with magnetic amplifier. 1st May, 1951. (685023.)

12461. Philips Electrical Industries, Ltd.—Apparatus comprising an anti-vibration mounting. 28th May, 1951. (685356.)

17718. Westinghouse Electric International Co.—Dynamo-electric machines. 26th July, 1951. (685357.)

19244. Standard Telephones & Cables, Ltd.—Electric carrier wave modulations. 15th August, 1951. (685358.)

22819. Standard Telephones & Cables, Ltd., Wilkie, D. A., and Gordon, K. S.—Methods of recording electrical signals. 22nd October, 1948. Divided out of 685102. (685109.)

23397. Compagnie pour la Fabrication des Compteurs et Matériel d'Usines à Gaz.—Frequency regulating devices. 8th October, 1951. (685029.)

23729. Metropolitan-Vickers Electrical Co., Ltd.—Detection or measurement of X-ray energy. 11th October, 1951. (685027.)

23748. Modern Telephones (Gt. Britain), Ltd., and Adler, A. E.—Intercommunication telephone systems. 11th October, 1951. (685197.)

23977. British Thomson-Houston Co., Ltd.—Control of d.c. generators. 15th October, 1951. Addition to 644619. (685110.)

1952

2063. Hoover (Electric Motors), Ltd., and Wickham, A. H.—Winding machines. 5th July, 1950. Divided out of 685121. (685199.)

TRADE MARKS

APPLICATIONS have been made for the registration of the following trade marks. Objections may be entered up to 5th December.

MAGNADUR. No. 710,956, Class 9. Permanent magnets.—Mullard, Ltd., Century House, Shaftesbury Avenue, London, W.C.2.

SOLWARM. No. 708,061, Class 10. Electrically-heated blankets.—Robert Holt (Middlesex), Ltd., Florence Buildings, Florence Road, Edmonton, London, N.18.

BOOKS RECOMMENDED BY

ELECTRICAL REVIEW

MODERN ELECTRICAL CONTRACTING
Business Organization and Routine
H. R. Taunton, A.M.I.E.E.
10s. 6d. net. By post 10s. 11d.

ELECTRICAL WHO'S WHO
Compiled by *Electrical Review*
2nd Edition. 12s. 6d. net. By post 13s. 2d.

DOMESTIC WATER HEATING
Basic Engineering Principles of Electric and Solid-Fuel Installations
Ronald Grierson, M.I.E.E., M.I.Mech.E.
25s. net. By post 25s. 7d.

ELECTRIC-MOTOR CONTROL GEAR
Starting, Protection and Speed
J. L. Watts, A.M.I.E.E.
5s. net. By post 5s. 3d.

MATERIAL HANDLING IN WORKS STORES
The Fork-Lift Truck and Pallet System
L. J. Hoefkens
10s. 6d. net. By post 10s. 11d.

PRODUCTION ENGINEERING
Practical Methods of Production Planning and Control. J. S. Murphy, A.I.I.A.
12s. 6d. net. By post 13s.

Obtainable at all booksellers or direct from:
The Publishing Dept., Dorset House, Stamford Street, London, S.E.1

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

CONTRACTS OPEN

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Bletchley.—5th January. U.D.C. Nine sets of electrically driven vertical unchokeable sewage pumps, to be installed at three pumping stations. John Taylor & Sons, Artillery House, Victoria Street, London, S.W.1.

Bootle.—11th December. Corporation. Electrical installation at County Secondary School for Boys. (See this issue.)

Bromley (Kent).—16th December. Corporation. Street lighting equipment. (See this issue.)

Dagenham.—10th January. Borough Council. Electric lamps and supplies for one year from 1st April. Borough surveyor, Civic Centre.

Farnworth.—1st December. Town Council. Electrical installation in 36 houses, Plodder Lane South. (See this issue.)

Houghton-le-Spring (Durham). — Urban District Council. Supply and erection of concrete lighting columns and fittings in connection with the conversion from gas to electric lighting of a section of road A.182. Surveyor, Newbottle Street.

India.—TRIVANDRUM.—20th December. Stores Purchase Committee of the Government of Travancore-Cochin. 11 kV switchgear for Ernakulam, Trichur, Thuckalai, Punalur, Shencottah, Peermade, Alleppey and Trivandrum substations. (C.R.E. 38581/52. Ten/5126.)*

2nd January. India Store Dept. Pole mounting transformers. (See this issue.)

Manchester.—10th December. City Council. Street lighting conversion boxes. (See this issue).

Mitcham.—6th December. Town Council. Street lighting improvements. (See this issue.)

New Zealand.—WELLINGTON.—12th January. Post and Telegraph Department, Wellington. Switchboard wire. (C.R.E. 38564/52. Ten/5128.)* 14th January. Diesel engine generator sets. (C.R.E. 38188/52. Ten/5134.)* Cables and cords. (C.R.E. 38592/52. Ten/5129.)*

DUNEDIN.—20th March. Pumping plant for the Jervois Street stormwater pumping station. (C.R.E. 38168/52. Ten/5132.)*

Ryton-on-Tyne. — Urban District Council. Installation of electric lighting and heating in 18 new houses on the Garden House estate, Crawcrook. Surveyor, Council Offices, Ryton Tower.

South Africa. — DURBAN. — 28th November. City Council. Telephone wire. (C.R.E. 38549/52. Ten/5121.)*

*Specifications may be inspected at the Commercial Relations and Exports Department, Board of Trade, Horse Guards Avenue, Whitehall, S.W.1 (Trafalgar 8855).

Swanage.—5th December. U.D.C. Street lighting equipment. (See this issue.)

West Hartlepool.—8th December. Borough Council. Electrically driven sewage pumps and equipment at Owton Manor pumping station. Town clerk, Municipal Buildings.

West Riding.—8th December. County Council. Renewal of electrical installations at Goole Grammar School and Honley C.E. School. (See this issue.)

ORDERS PLACED

Bolton.—Education Committee. Accepted. Installation of power plugs at the Tonge Fold County Secondary School.—N.W. Electricity Board.

Carlisle.—City Council. Electrical installations in 130 new houses.—North Western Electricity Board.

London.—POPLAR.—Borough Council. Recommended. One 4-person passenger lift at Block V, Bazely Street (£1,540).—Bennie Lifts, Ltd.

Contracts and Purchasing Committee. Electrical installation works at Block "E" flats at Tetley Street (£2,739).—Hancox & Co., Ltd.

Manchester. — Electrical installation at Christie Hospital (£7,737).—S. Dickinson, Ltd.

Housing Committee. Accepted. Electrical installations in 395 houses at Bowlee (Contract 165).—F. L. Bampton & Co., Ltd.

Peterborough.—Estates Committee. Recommended. Electrical installations in 50 houses, Dogsthorpe North Housing Estate (£1,328).—M. F. Hansen.

Sheffield. — Corporation. Electrical installation work at Holt House County School (£2,357).—Yorkshire Electricity Board.

Stockton-on-Tees.—Town Council. Electrical installation, Roseworth County Infants' School (£1,480).—Dove & Partners. Electrical installations in 79 new houses at Roseworth (£1,800).—W. Stewart & Son.

Surbiton. — Highway Committee. Recommended. Traffic lights at the St. Mark's Hill/Ewell Road crossroads (£1,107). — Automatic Telephone & Electric Co., Ltd.

Thornaby-on-Tees.—Town Council. Electrical installations in 35 houses on the Diamond Road estate.—W. S. Wilkes, Stockton-on-Tees.

West Hartlepool.—Town Council. Supply of 50 electric wash boilers of the "Burco" type.—Marshalls, Ltd.

Worcester.—City Council. Recommended. Renewal of the electrical installations at the Victoria Institute Technical College (£1,756).—Midlands Electricity Board.

WORK IN PROSPECT

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Aberystwyth.—Dwellings (136), on six sites; R.D.C. surveyor, Chalybeate Street.

Alnwick.—Houses (14) at Craster for the R.D.C.; T. J. Cahill, architect, Lloyds Bank Chambers, Alnwick.

Bexley. — Dwellings (158), Halcot estate; borough surveyor.

Bishop Auckland. — Technical college; county architect, Court Lane, Durham.

Blaby.—Houses (162), on four sites, to be erected in 1953; F. W. James, R.D.C. surveyor, Council Offices, Narborough.

Bridlington.—Houses (99), Westhill estate; S. Briggs, town clerk, Town Hall.

Carlisle.—Houses (100), Harraby, for City Council; city engineer, 18, Fisher Street.

Cheshunt.—Houses (128), Crossbrook Street estate; G. S. Newnham, clerk to U.D.C., Manor House.

Colwyn Bay.—Houses (48), west of Voryn Avenue, Old Colwyn; N. S. Jeffrey, borough surveyor, Town Hall.

Darlington.—Junior school, Hutton Avenue; borough architect.

Durham.—Junior school at Peterlee; county architect, Court Lane.

Edinburgh.—Houses (369), and eight shops in the Clermiston area (£589,000); city engineer, 329, High Street.

Glasgow.—Building works at Pinkston Road for Steel Reinforcement Co., 19, St. Vincent Street.

Harlow.—Mark Hall South Primary School; H. T. Cadbury-Brown, architect, 17, Clarges Street, W.1.

Hyde. — Extension and re-development of works; T. Wall & Sons, Ltd., Mottram Road.

Hythe (Kent).—Houses (62), Cinque Ports Avenue extension site; Willan, Stewart & Waite, architects, 127, Sandgate Road, Folkestone.

Ilford.—Eighteen shops, with flats over, High Street, Barkingside; Suburban Developments (Ilford), Ltd., 667, Eastern Avenue.

Ince-in-Makerfield. — Proposed new glass works at Platt Bridge; C.W.S. Architect's Department, Balloon Street, Manchester.

Keighley.—Work to commence shortly on new technical college (£80,000); county architect, Wakefield.

Lincoln.—Flats and maisonnettes (114), Riseholm estate; city architect, Stamp End.

London. — DEPTFORD. — Out-patients' and casualty department at New Cross Hospital; South East Metropolitan Regional Hospital Board, 9, Hallam Street, W.1.

LEWISHAM.—Houses (58), on several sites; borough architect, Canadian Avenue, Catford, S.E.6.

ST. MARYLEBONE.—Five-storey block of flats, Gloucester Place; Welch & Lander, architects, 38, Gloucester Place, W.1.

Lowestoft.—Houses (56), Whitton estate; borough surveyor, 49, High Street.

Lytham St. Annes.—Houses (104), Hilton Avenue area; W. Heap, town clerk, Town Hall.

Newcastle-on-Tyne.—Second instalment of new college of technology in Northumberland Road (£168,000); city architect, 18, Cloth Market, Newcastle.

Houses (354) at West Denton for City Council; John T. Bell and Sons, Ltd., builders, Northumberland Place, Newcastle-on-Tyne.

New Cumnock.—Nurses' home at Glenafton Hospital for North Ayrshire Hospital Board; James Steel & Hay, 13, West George Street, Glasgow.

Oldham.—Factory extensions for Meredith & Drew, Ltd.

Houses, Limeside estate (32) and Fitton Hill estate (34); Cameron & Middleton, architects, 21, Queen Square, Oldham.

Otley.—Flats, Weston estate; U.D.C. surveyor.

Petworth. — Houses (52), at Wisborough Green; surveyor, Rural Council Offices, Petworth, Sussex.

Plymouth. — Operating theatre, Freedom Fields Hospital; C. R. Tozer, architect, 7, Nelson Gardens.

Portsmouth.—Maisonnettes and flats (66), Sultan Road; city architect.

Prudhoe (Northumberland).—Old people's bungalows (12), Priestclose; U.D.C. surveyor.

Rugeley.—Houses (1,200) for miners at Lea Hall Colliery; U.D.C. surveyor.

Stanley (Durham). — Methodist Church school hall at East Stanley (£6,000); J. Wilson Hays, architect, Wingate.

Stockton-on-Tees. — Out-patients' department at Children's Hospital; P. H. Knighton, "Dunira," Osborne Road, Newcastle-on-Tyne.

Stopsley (Luton).—School on 20-acre site at Ashcroft Road; Bedfordshire county architect, Shire Hall, Bedford.

Sunderland.—Communal wash-house at the East End; borough architect, Stockton Road.

Tipton. — Erection of factory at Tividale; British Industrial Engineering Co., Ltd., Horseleyfields, Wolverhampton.

Todmorden.—Houses (26) and flats (16) at 2nd portion of Harley Wood estate; F. Lindop, architect, Bridge Street, Todmorden.

Torquay.—Four shops with living accommodation, Sherwell Valley Road; Chelston Building Co., 11, Walnut Road.

Wakefield. — Adaptation of Chevet Hall Special School (£80,600); city architect.

Houses (100), Kettlethorpe estate; city engineer.

Walsall.—Houses (22), Alumwell Road estate and three-storey flats (30) at Little Bloxwich site; borough surveyor.

Walton-on-Thames. — Primary school, Sandy Lane; county architect, County Hall, Kingston-on-Thames.

Wem (Salop).—Houses (55), Shawbury, for R.D.C.; A. E. Williams, architect, Dogpole, Shrewsbury.

West Ham.—Maisonnettes (50), Queen's Road, E.13; T. E. North, borough architect, 70, West Ham Lane, E.15.